Canning Flowsheet

JANUARY 1956

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FOOD ENGINEERING

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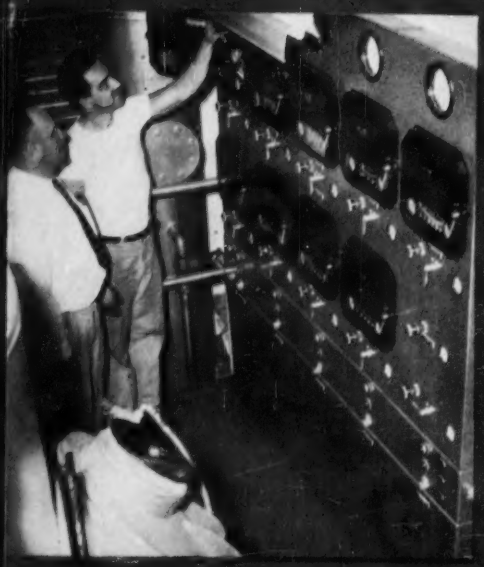

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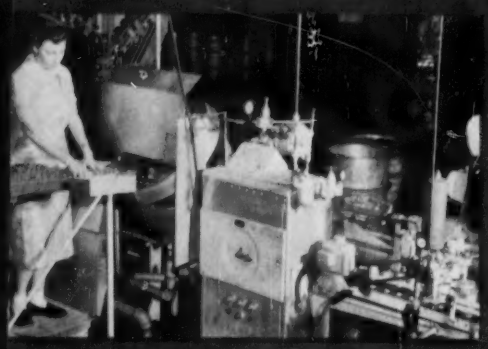

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INSTRUMENTATION • TRANSPORTATION • QUALITY CONTROL
INGREDIENTS • PRODUCTS

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January 1956

Volume 28 Number 1

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FOOD ENGINEERING

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For stainless, first of all, fights off corrosive attack. And it's strong. Stainless becomes tougher the more it's used . . . which is another way of saying that, with stainless, abrasion is no problem. And neither is cleaning. For stainless steels' smooth, bright surface comes clean with a minimum of effort . . . stays clean longer.

The fact is, stainless makes any equipment stronger, longer-lasting, easier to use. Check with your local Crucible representative for help in selecting the best stainless grade for your job. Or write *Crucible Steel Company of America, The Oliver Bldg., Mellon Sq., Pittsburgh 22, Pa.*

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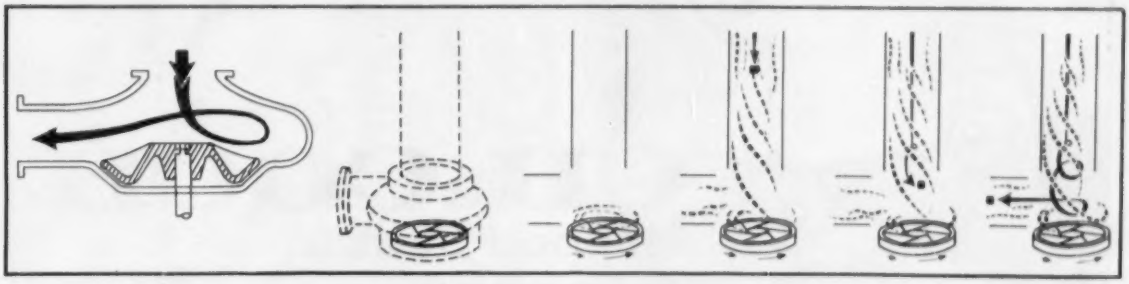
PRACTICAL IDEAS



A New Twist To Pumping Solids

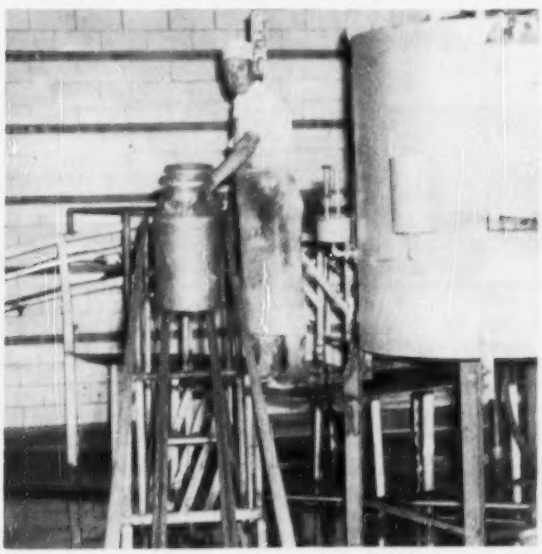
Do you have trouble pumping solids without damaging the product or wearing the pump excessively? If so, the experience Bireley's Division has had with a unique new pump over the past year may help you solve your problem.

A new concept in pumping design makes it possible for the completely recessed torque-developing impeller to impart a swirling action to the fluid, thus transmitting power as a fluid-flow torque converter does in an automobile. Strong suction and pressure heads are created for pumping without solid materials passing through the impeller. This means that with few solids actually touching the impeller, there is less wear on the pump, no danger from clogging, and practically no damage to product while passing through pump.

At Bireley's, we have used a 3-in. Torque-Flow pump quite satisfactorily for more than a year, to feed a mixture of pectin liquor and diatomaceous-earth filter aid to our filters. The centrifugal and positive displacement pumps we had used previously, suffered from excessive wear and consequently, our maintenance costs were high.

Other plants have found such varied uses for this new pump that many food plant applications probably exist. For instance, such highly abrasive solids in high concentration as ready-mixed concrete, sand, and crushed ore have been moved successfully. Tests have shown that when the pumping system is properly designed and operated, fragile solids like fruits, vegetables, and crystals can be pumped in water suspension without damage—often more cheaply than moving the solids by conveyor. Even such fibrous materials as rags, paper, and rope fail to clog the pump, for all pump clearances are as large as the pipe.

At present, pump is made in sizes from two to eight inches, and the manufacturer is well equipped with test facilities to advise on special applications.—*R. E. Cox, Research Mfg., Bireley's Div., General Foods Corp., Hollywood, Calif.*



Milk Can Gravity Conveyor

At the plant of Denver United Dairy Corp. incoming milk cans are received on a truck dock and transferred by conveyor up a 5-ft incline to the scales for weighing before dumping. Originally, cans were then carried by hand across the room where they were placed on an outgoing floor conveyor.

The obvious bottleneck which existed in the handling of empty cans from the receiving tanks to the conveyor on the other side of the room was overcome by installing a gravity conveyor which transfers cans from the scale platform over a distance of some 18 ft with a drop of 18 deg. directly to the floor conveyor. Cans now slide onto the latter to be conveyed to the loading dock.

The gravity conveyor (see photo) was welded together from lengths of 2-in. and 1¼-in. pipe. Empty cans now slide easily down the length of this gravity conveyor around an arc of approximately 80 deg. and directly onto the floor conveyor belt, thus making it unnecessary for employees to handle the cans except for weighing and dumping operations.—*Robert Latimer, Denver, Colo.*

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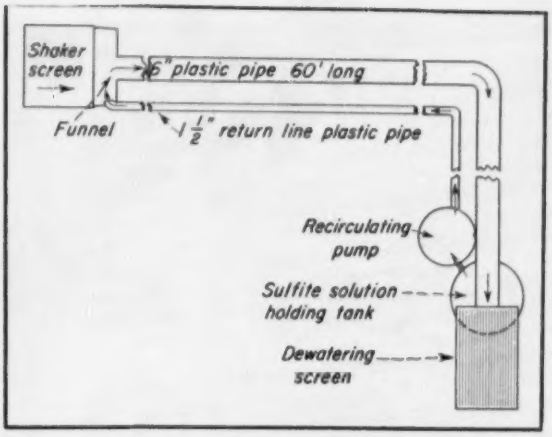


Simplified Sulfiting

In the past, like almost all other packers of sulfite treated apples, we used a stainless steel tank to hold the sulfite solution with various means to move fruit through this tank—paddle wheels, drag chains, wire mesh belts. However, we found that such a procedure had draw-backs.

First, the initial cost was relatively high. Also, costly maintenance was frequently required due to the corrosive action of a solution. We learned too from experience that maintaining the desired percentage of SO_2 was difficult since the material had to be added frequently and was hard to mix in. Furthermore, we found it difficult to maintain the correct level of solution to insure that each piece of apple was thoroughly treated. Lastly, since we employed an open tank of sulfite solution we experienced difficulty with SO_2 fumes and had to install an exhaust hood and fan.

In building our new line we gave considerable thought to the elimination of these problems and came up with the following solution.

We now drop our sliced apples into a funnel (see sketch) that feeds the slices into a 60 ft. long line of 6 in. general purpose plastic pipe.

A stream of sulfite solution is pumped through this plastic pipe. This not only insures proper saturation of the apple slices but also transports them. At the end of the travel the mixture of fluid and slices is discharged onto a stainless steel dewatering screen and then the slices go to an inspection belt. Fluid returns to a holding tank where it is kept warm until returned by a Tri-Clover pump to the entrance end of the equipment.

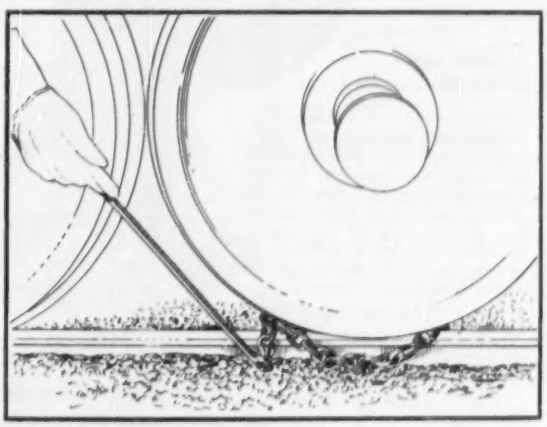
This method has overcome all of the disadvantages mentioned plus adding several advantages we had not contemplated. The initial cost was very low (it cost us only $200 for the pipe and fittings) and we had all the other equipment needed on hand from other lines. Even if it had been necessary to purchase all equipment new, cost would only have been about 80% of the amount required for a tank of equal capacity.

Equipment maintenance cost has proved to be relatively low since almost everything touching the sulfite solution is stainless or plastic. Holding temperature, proper liquid level, and sulfite content all are relatively simple now since the pump mixes very thoroughly and therefore testing can be done in the holding tank.

The problem of disagreeable fumes is negligible and our exhausting system is no longer needed. In addition to these gains cleanup is much simpler, since all we need to do is circulate cleaning solution through the equipment. Lastly we now have a neater and more compact setup which is an asset in our limited space.—*Douglas Manly, Manager, Southland Food Products Corp., Barker, N. Y.*

Makes Own Heat-Sealer

Company-made machine speeds wrapping of franks. Operator places sleeved hot dogs on table—(A) in photo—, then, with a quick turn of the wrist, wraps them in film. Next, package is drawn toward operator and placed on heat-seal plate (B), which secures the flaps. Electrically heated wire (C) cuts film automatically. Unit is compact, portable, and gives a thoroughly sealed and very tight wrap. Furthermore, film waste has been reduced to zero, also labor required for rewrap.—*FE Staff*



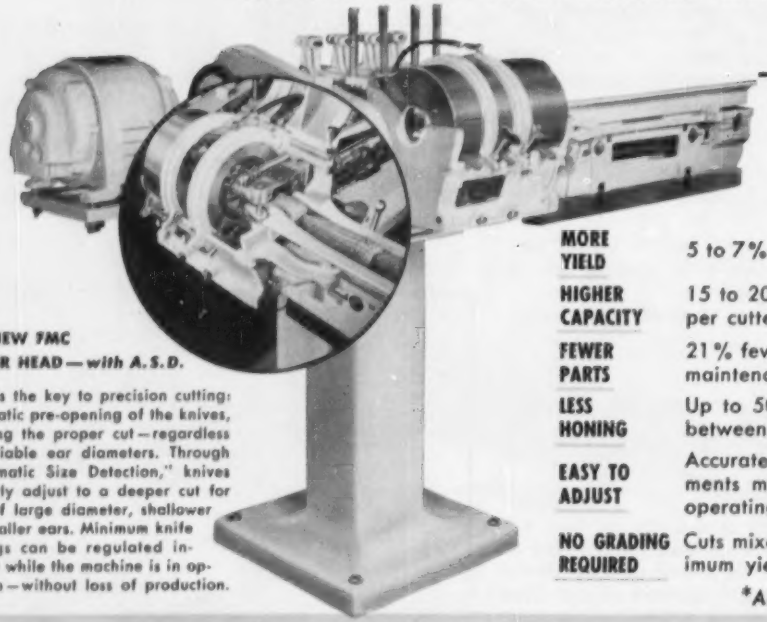
Non-Splinter Railroad Car Chock

In order to improve housekeeping and reduce possibility of injuries as a result of wood splinters from car chocks, the chain-type chock was developed. Device consists of a length of heavy chain (see sketch) to which is attached a steel rod with a hand-hold loop at the end. Device has proved satisfactory in that it is easy to apply and release, is positive in action and easily maintained.—*National Safety Council, Chicago (DuPont Corporation contributed).*

Announcing the NEW NEW NEW fmc CORN CUTTER

The Model 3-A Corn Cutter introduces an entirely new concept of cost-saving automation. It is unequalled for high yield and quality of cut. Proved through thousands of hours of actual operation, this is the first major advancement in corn cutters since the FMC Universal Model No. 2—the machine in widest use today. Here is the cutter with the all-new A.S.D. —"Automatic Size Detection," a unique system of pre-opening knives, which cut both large and small ears close and clean without the need for size grading or constant machine adjustment. Other new features: fewer cutter head parts; simpler and more accurate cut adjustments; easier to clean; automatic lubrication. The Model 3-A affords packers an unusual opportunity of major increases in plant profits through improved cut corn recovery at lower cost per ton.

Model 3-A UNIVERSAL with A.S.D.*



ALL-NEW FMC CUTTER HEAD—*with A.S.D.*

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—and all these exclusive ADVANTAGES

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FEWER PARTS	21% fewer parts—for reduced maintenance!
LESS HONING	Up to 50% more cutting time between knife honings!
EASY TO ADJUST	Accurate depth control adjustments made while machine is operating!
NO GRADING REQUIRED	Cuts mixed ear sizes with maximum yield!

*Automatic Size Detection

See the new FMC Model 3-A Corn Cutter on display at the Canners Show in Atlantic City, Jan. 18 to 21.

FREE CORN CUTTER BULLETIN NO. CMD. 601E, available on request, gives you full details, illustrates the many outstanding features of the FMC Model 3-A. Write today!

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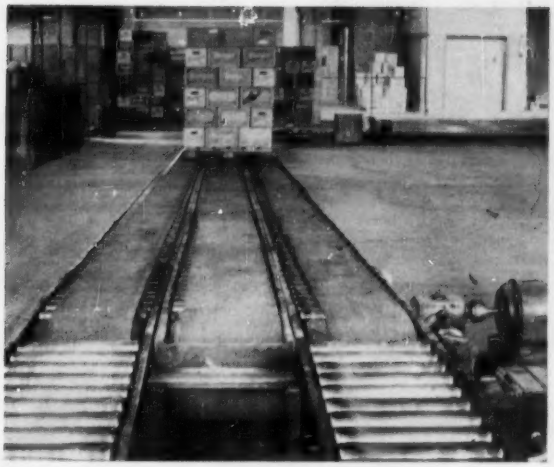


Case Conveyor Into Pallet Conveyor

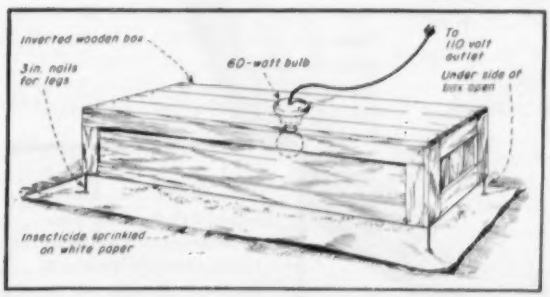
After converting our bottle-beer case-warehouse from one with conveyors to a completely palletized warehouse, we had a few thousand feet of case conveyors for which we could see no immediate use. Nor were we very successful in our attempt to sell them.

We then hit upon a very practical use for this excess conveyor.

By turning the conveyor upside down so that the rolls would be above the side rails and then equipping them with rubber grip-top belting we made a powered pallet conveyor out of the discarded case conveyors.

The pallet conveyor is located at the discharge point of a pallet lift elevator. Thus, we are able to accumulate many pallet loads of returned empty bottles. We then bring them to a point where the cases are fed back to the bottle washing machines, all without the service of a lift truck, and without employing any manpower.

Since the power belt driven pallet conveyor is in time with the round trip travel time of the pallet lift elevator, we maintain a maximum accumulation of pallets on the conveyor.—*F. J. Sellinger, Supt. of Packaging, Burger Brewing Co., Cincinnati, Ohio.*


Inverted wooden box
3 in. nails for legs
60-watt bulb
To 110 volt outlet
Under side of box open
Insecticide sprinkled on white paper

Common Sense Insect Trap

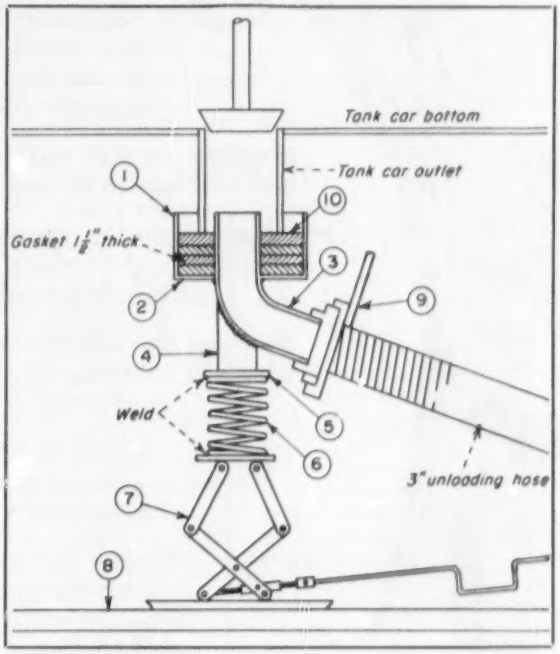
In our cheese storage rooms flies and other small insects pose a nettling problem. This was complicated by the fact that the 55 to 60 Fahrenheit temperature with 90% humidity, and shelves loaded with cheese prevented effective use of insecticide sprays.

However, insect removal is now practically 100% perfect and this is how it is done.

An electric light socket was installed in a discarded wooden packing box (see sketch) 2½ ft. long by 1 ft. wide by 6 in. deep. The top of the box was left open and 3-in. nails driven a little way into each corner to serve as legs. Finally, Fly Flakes (a granular insecticide containing 2% Malathion) was sprinkled on a piece of white paper and put under the box.

The light from a 60-watt bulb inside the box was reflected downward onto the paper, keeping the insecticide dry and providing a warm, well-lighted area which attracted flies and insects like a back porch light. Since the insecticide is kept dry it remains effective for days instead of hours and pests have been virtually eliminated.

Spent insecticide and dead insects are conveniently rolled up in the paper and neatly disposed of to avoid any possible danger of getting poisonous insecticides into the cheese. Furthermore, the objectionable odor of insect sprays is avoided.—*M. Graham, Assoc. Prof., Clemson Agricultural College, Clemson, S. C.*



Connection Aids Tank Car Unloading

Here's a device for meeting the variable conditions encountered in tank car unloading—a device that speeds the operation and guards against leakage regardless of the condition of the car's outlet threads.

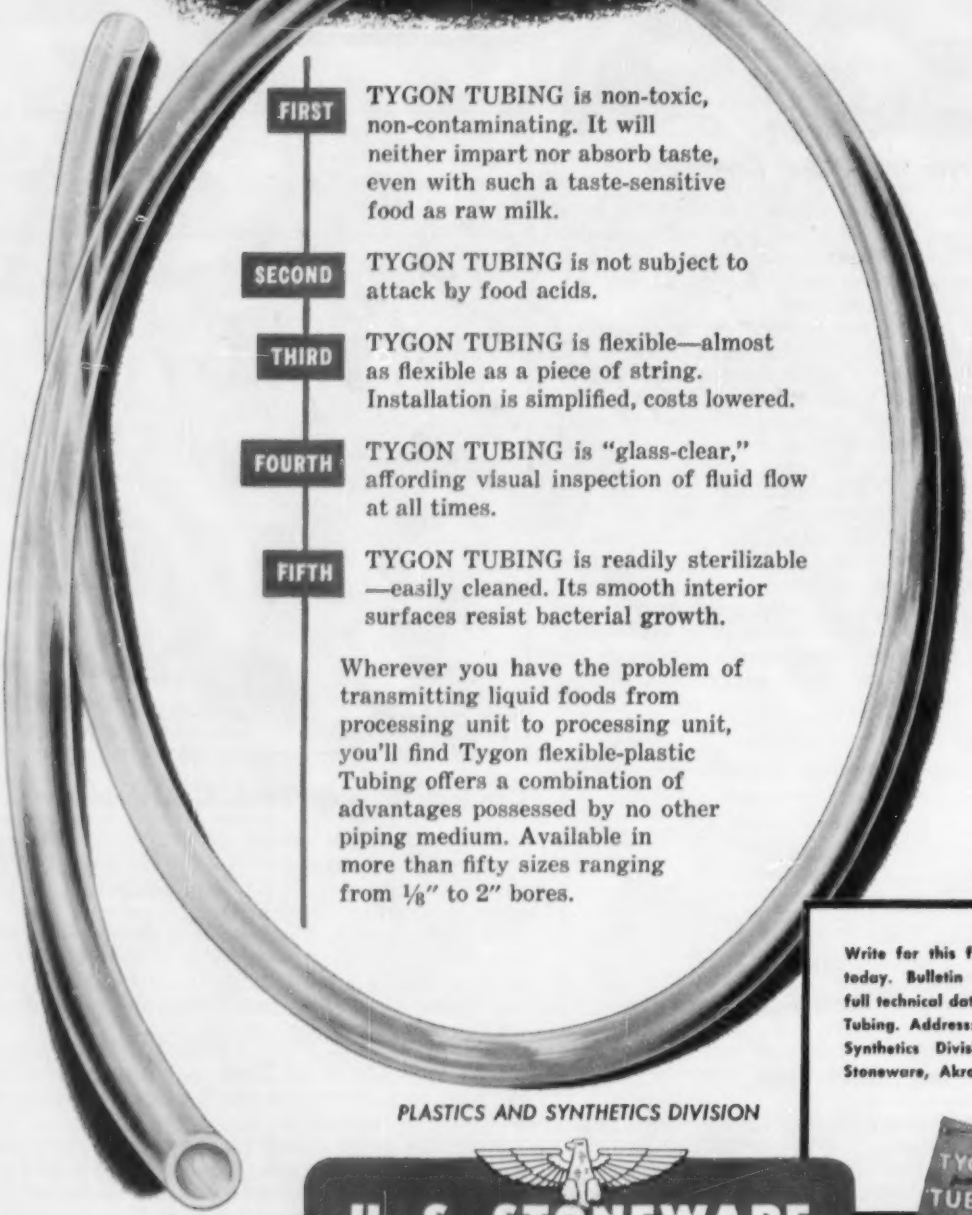
One side of a 6-in. coupling—(1) in sketch—was welded to a plate (2) of approximately ¼ in. thickness. Into this plate an opening was cut, large enough for the end of a 3-in. 80-deg elbow (3) to pass through and extend to the top and open side of the coupling.

Now, the coupling is welded to the plate and a pedestal support (4) welded to the elbow and flanged with a plate (5) larger in diameter than the front end coil-spring (6) of a Mercury automobile.

Next, this spring (which can be obtained from most automobile graveyards), was welded to the pedestal's support plate and also to the deck of a 2-ton scissor jack 11-in. lift (7). This assembly was then mounted on a 10-in. channel (8) (which could also be mounted permanently between the rails).

Two more details completed the assembly. A 3-in. unloading hose was attached by a Morrison quick-detachable coupling (9) to the exposed end of the 3-in. elbow,

Five reasons you'll find *TYGON plastic TUBING* a better piping medium for liquid foods



FIRST TYGON TUBING is non-toxic, non-contaminating. It will neither impart nor absorb taste, even with such a taste-sensitive food as raw milk.

SECOND TYGON TUBING is not subject to attack by food acids.

THIRD TYGON TUBING is flexible—almost as flexible as a piece of string. Installation is simplified, costs lowered.

FOURTH TYGON TUBING is "glass-clear," affording visual inspection of fluid flow at all times.

FIFTH TYGON TUBING is readily sterilizable —easily cleaned. Its smooth interior surfaces resist bacterial growth.

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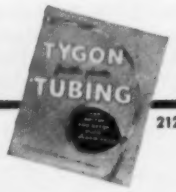

212-E

PLASTICS AND SYNTHETICS DIVISION

U. S. STONEWARE
AKRON 9, OHIO

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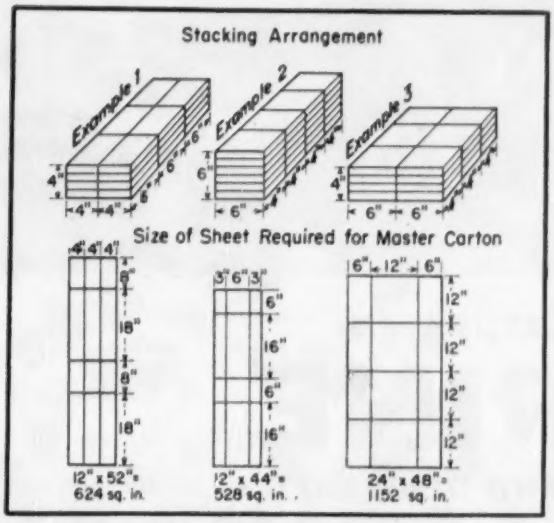
and then the space between the top of the elbow and the sides of the coupling was packed with 1½-in. gasket material (10). The assembly was then ready for use.

Since the jack has a rise of 11 in. and also since the coil spring takes care of any variations that take place during the process of unloading, the height of the drain from the rail is immaterial. This device fits all tank car drains regardless of size or condition of thread. The scissor jack, which applies pressure of approximately 1200 lb through the coil spring to the gaskets, makes a positive seal.—*C. M. Gloege, Project Engineer, Western Condensing Co., Appleton, Wis.*

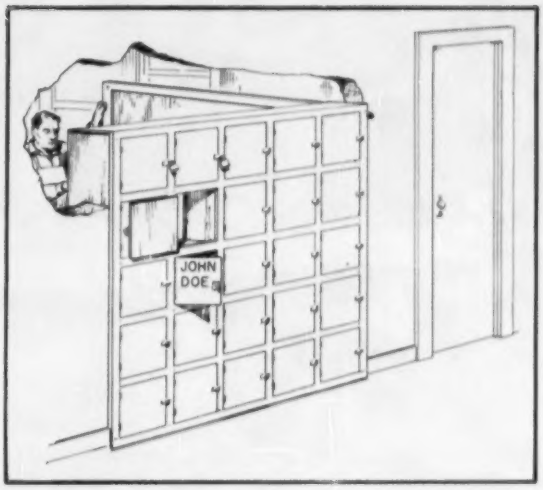


Carton Size Selection

Here's a simple way to calculate the best procedure for stacking units within a master using a minimum of board.

The price of a master carton is directly proportional to the area of board used. In a regular slotted container (RSC) the only double thickness occurs because of the end flaps. Area of the board represented by these four end flaps is $4 \times \frac{1}{2} W \times W = 2 W^2$. Hence, since the volume of the unit to be packed is constant, the smaller the width of the carton the less board will be used.

Also necessary to consider in determining the minimum width in relation to the length and height, are accessibility and ease of handling. As an example, I have chosen a carton 6 in. x 4 in. x 1 in. to be packed 24 to a master (see sketch) and to be mastered three ways. Example No. 2 is the least expensive but might be hard to handle and stack. Example No. 1 is about half as expensive as example No. 3 and there would be no stacking or handling problem.—*Charles L. Proctor, Asst. Production Mgr., Fulham Bros., Inc., Boston, Mass.*



Improved Laundry Handling

In a small plant run by 15 inside employees we have our own washer-dryer for laundering uniforms. Workers discard soiled uniforms at the end of the shift each day and receive clean ones the following morning. To prevent loss through theft or otherwise, we have built an arrangement, following, in general, the pattern of post office boxes. This unit (see sketch) made entirely of 1 in. by 2 in. and 1 in. by 12 in. framing and ¼ in. plywood doors has solved our problem.

Now at the end of a shift each worker places his soiled clothes in his own individual locked compartment. The person designated as responsible for the laundry operation has a key to the door opening the entire opposite side of the cabinet. Clothes are removed by this operator, machine laundered and placed back in proper compartments. Management retains a key to each worker's padlock just in case some worker should forget or lose his key.

Besides preventing undue loss of clothes the eyesore appearance of soiled laundry is also removed from the plant scene.—*Allen C. Klingerman, Sales Mgr., Klingerman Dairies, Inc., Atlantic City, N. J.*

Speeds Mixing

When it is desired to mix a small amount of a material that is difficult to wet or which tends to clump in a large volume of liquid, it will be found helpful to first make a slurry of the two in a Waring Blendor. The speed of this unit may be controlled by use of a regulator such as the Powerstat (The Superior Electric Co., Bristol, Conn.). When speed is thus controlled an excess of air is not beaten in to make a viscous or foaming solution. —*Warren Averill, Assistant Professor, Univ. of New Hampshire, Durham, N. H.*

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Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

NOVEMBER PRACTICAL IDEA WINNER was "Refrigeration Losses Curbed," sent in by Carl Erickson, Plant Engineer, and William Topps, Supervisor, Market & Shipping, Reliable Packing Co., Chicago.

HOW THE LIXATE PROCESS SAVES MONEY, SAVES TIME IN THE FOOD PROCESSING INDUSTRY

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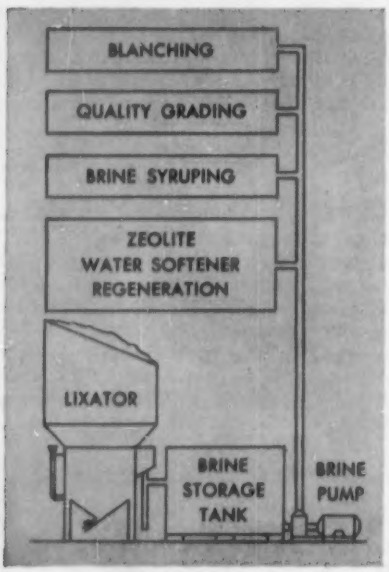

The simplified diagram at the left shows how with International Salt Company's Lixate Process all the brine needed in a canning plant is made *automatically* at one source. Then is automatically delivered, via piping, to as many points and for as many uses as desired. All plant rehandling of salt is eliminated. The brine is *always* constant in quality—*always* self-filtered—*always* 100% saturated —*always* crystal-clear.

One Lixate installation in a canning plant, for example, makes and delivers brine as needed—for blanching—for quality grading—for syruping—for regenerating zeolite water softeners.

Today, the Lixate Process continues to revolutionize brine making and brine handling throughout all types of industry. It makes better brine more efficiently, from economical rock salt. It saves many dollars daily by eliminating handling costs—and preventing costly production delays. Lixate brine is always on hand—always ready for instant use.

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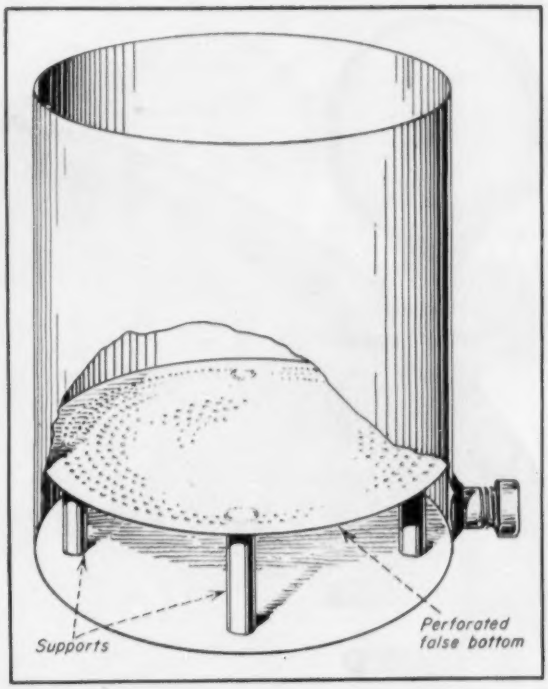


Cheese Vat Drain

Though many small dairies have found it desirable to make both large and small curd cottage cheese, usually only one cheese vat is available. So curd is cut one size one day and another the next day as the demand indicates. In some instances the large curd variety is made only once or twice a week. Then the curd is stored in a 3% sodium chloride solution and packaged fresh as needed.

Here is a convenient and sanitary method of draining the brine from the curd.

Weld a 1-in. stainless steel threaded pipe (see sketch) near the bottom of the curd can so that a cap can be screwed on. Next, prepare a perforated plate that will just fit the can with support legs about 2 in. long.

When the cap is removed 4 or 5 hrs. before the curd is needed the brine will drain through the false bottom. The entire assembly is easily cleaned and sanitized. Also, the curds can be kept cold while it is draining, if the cold room has a floor drain for the brine to run into.—*R. A. Hibbs, Assist. Professor, Dept. of Dairy Husbandry, Univ. of Idaho, Moscow, Ida.*

Clothes Wringer Makes Corrugator

A do-it-yourself story from Birds Eye's Pocomoke plant shows there's still room for a good gadget.

Pocomoke is running a pilot plant operation on precooked chicken parts wrapped in aluminum foil. (The housewife can heat the chicken right on the foil and save herself some pan-washing.)

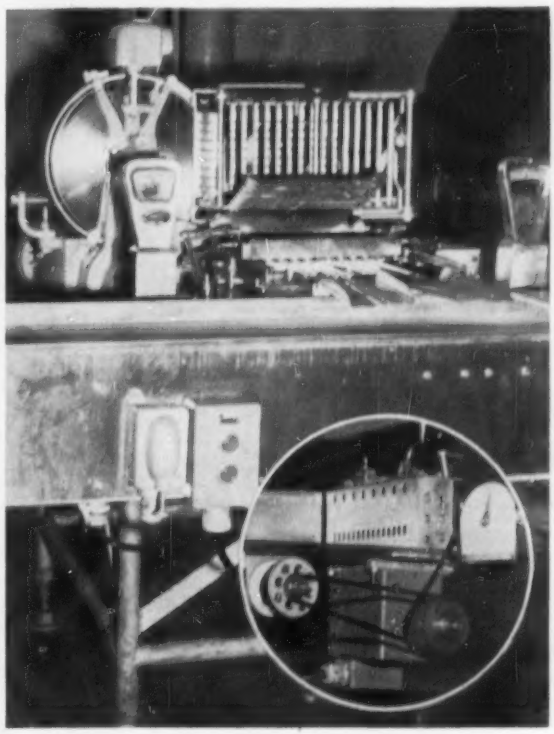
To do the best job, the foil should be corrugated, but it doesn't come from the supplier that way. Until an already-corrugated foil can be obtained, some way had to be found to put the right kind of crease in smooth foil.

An ordinary washing machine clothes wringer is the basis of the device. One roller was wrapped with sponge rubber, the other, with wire belting to crease the foil as it runs through. To take it one step further, a small electric motor was attached to the wringer. With the motor, the device can handle 800 feet of foil an hour, and the operator has only to feed the aluminum into it.—*J. Cameron, Pocomoke Labs, General Foods Corp., Pocomoke, N. Y.*

Detergent Cost Cut 30 Percent

We believed a considerable amount of detergent was wasted daily by employees, through carelessness, or the belief that "too much was better than too little."

Then, we experimented by measuring detergent into ¼ lb. bags, and made these available to all who needed them. No loss in cleaning efficiency resulted, and detergent consumption dropped 30 percent.—*Robert G. McCutcheon, Maola Milk & Ice Cream Co., New Bern, N. C.*



Unit Adds Convenience To Slicer

Before installing this handy control device, cold cut slicer operator had to circle the entire production line to adjust micrometer that governs meat thickness.

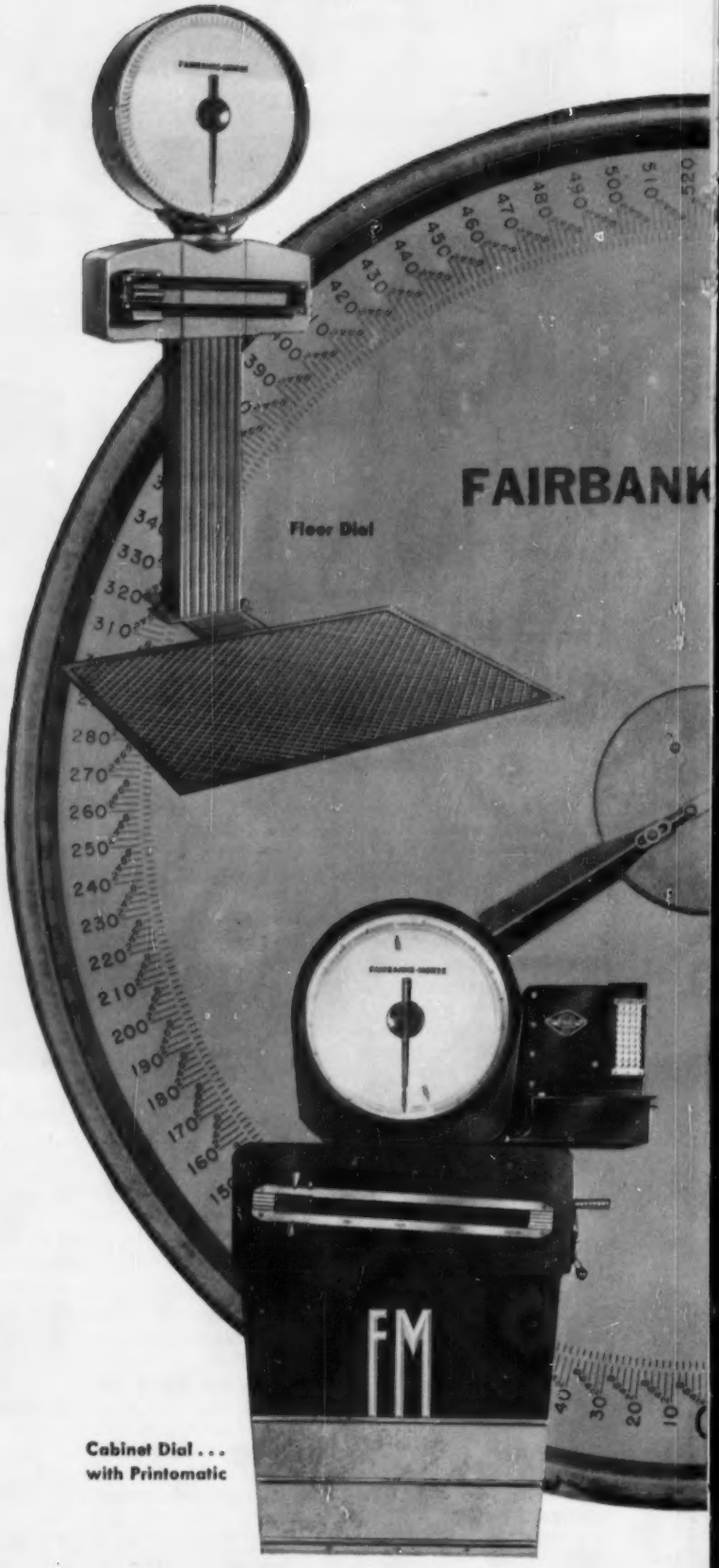
Now, operator stays put and merely presses buttons on a reversing switch (lower left in photo) that controls forward and back movement of a 12 v. damper motor (Minneapolis-Honeywell). Chain drives connect this motor with the original vernier device (U. S. Slicing Machine Co.) and a company-made scale easily visible from the front of the machine (see insert).—*FE Staff*

V-Belt Identification

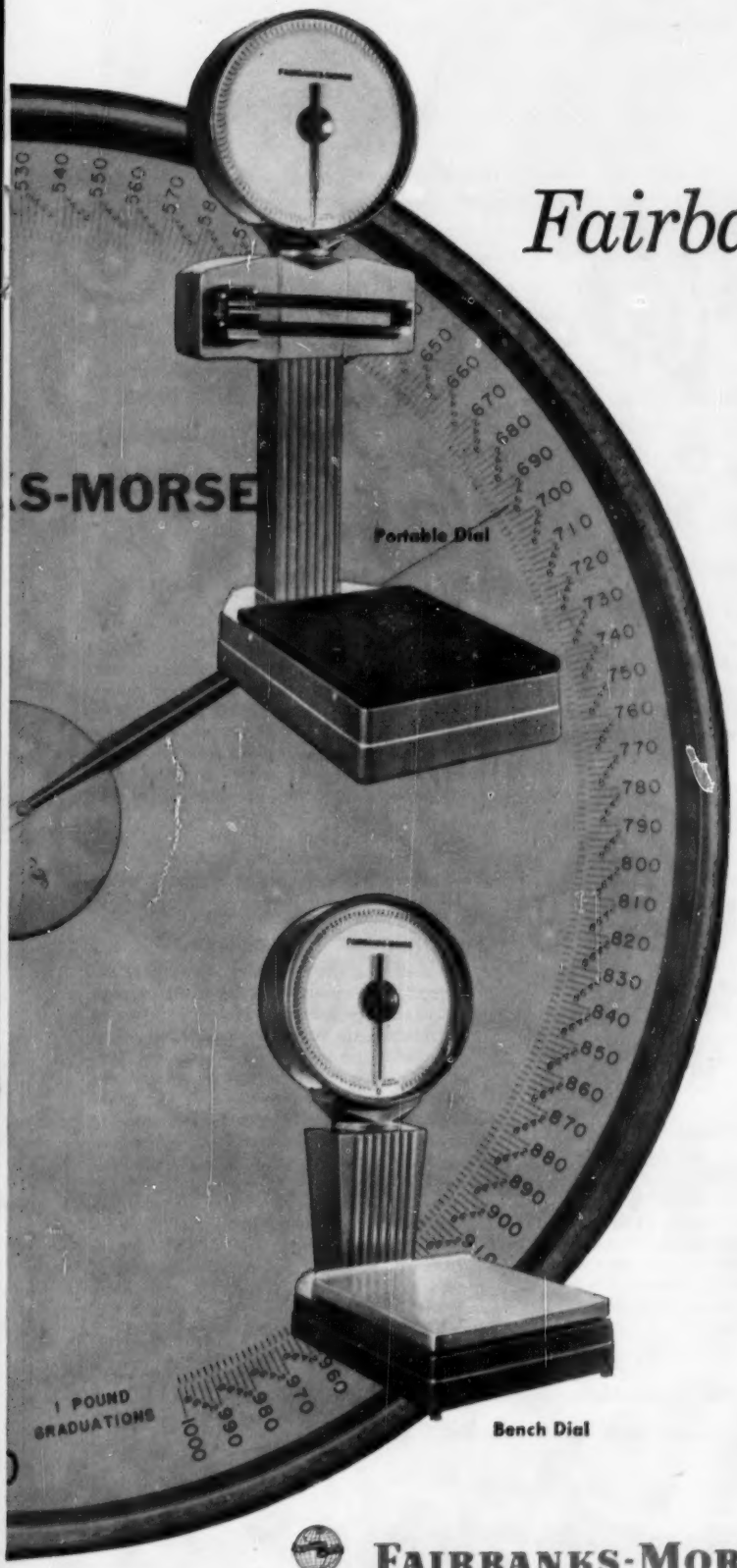
Frequently costly production line time is lost replacing a V-belt when size markings have been obliterated.

This loss is avoided when a metal tag carrying information identifying belt and pulley sizes and also distances between centers is attached to the drive guard.—*T. Cherbas, Mech. Eng., Kellogg Co., Battle Creek, Mich.*

announcing:



Cabinet Dial . . . with Printomatic



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Water soluble spice extractions made from pure natural oils and oleoresins, the SPICEOLATE LINE is excellent for seasoning products containing a high percentage of water, such as pickles, catsup and other condiments. A low vapor pressure makes their use advantageous in processes where high temperatures are required. Available in Natural Oils, Mixed Natural Oils and Special Mixtures.

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Dry soluble spice seasonings, especially designed for the canned food processor, sausage maker or meat packer. In the manufacture of dry solubles, all the active flavoring elements are distilled from natural spices and prepared in various dry carriers in strength and mixture desired, so as to be ready for instant use by the food processor. Full utilization of flavor is obtained immediately after processing. To the catsup packer SPISORAMA SEASONINGS offer freedom from the problem of "black neck". . . the salad dressing manufacturer gains a creamy white product free from specks. SPISORAMA SEASONINGS have standardized flavor values . . . the cost of maintaining control checks is eliminated. Available in basic soluble spices and in any desired compound mixture.

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FIG. 2453 G—Stainless Steel O.S. & Y. Globe Valve for 150 Pounds W.P.

FIG. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 Pounds W.P.

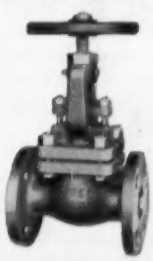
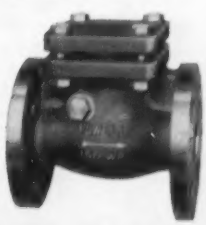


FIG. 2342—Stainless Steel Bolted Cap Swing Check Valve for 150 Pounds W.P.



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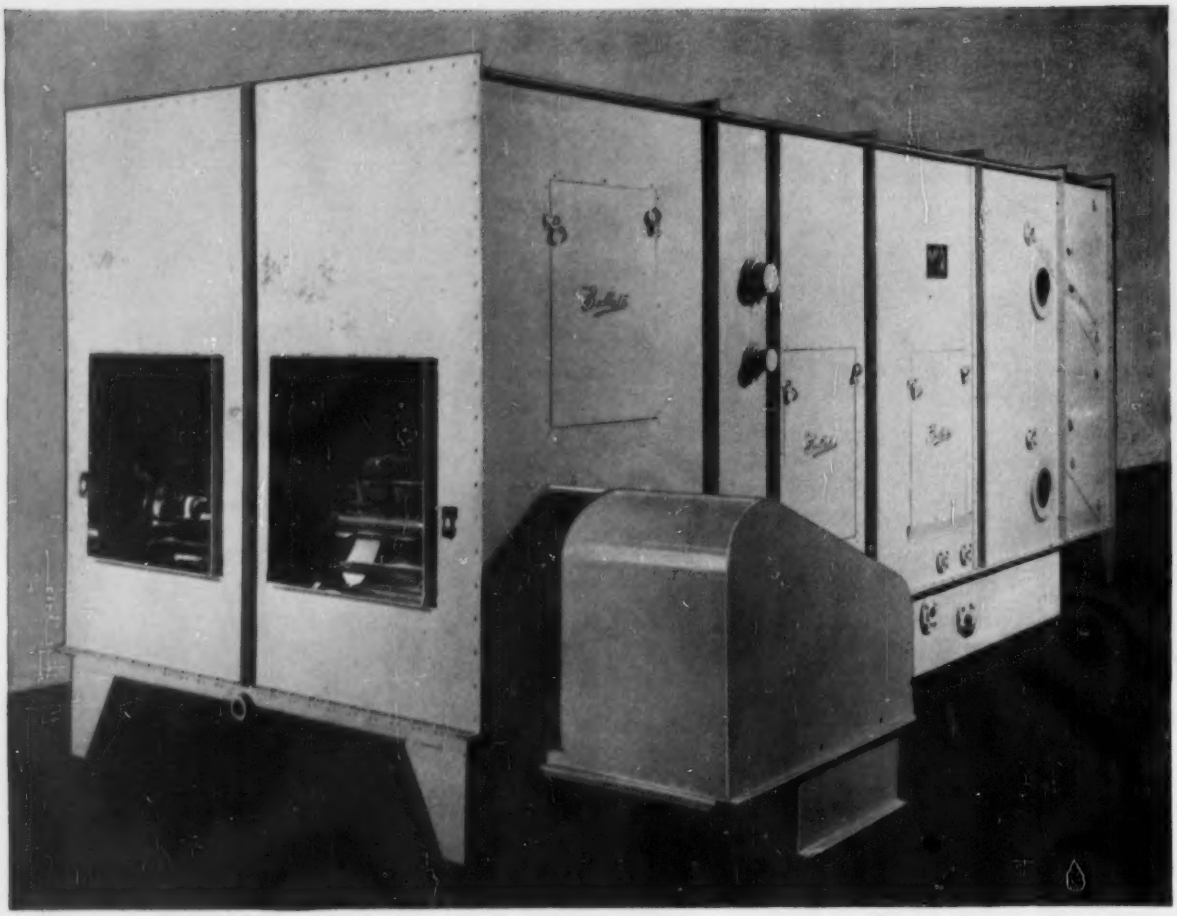

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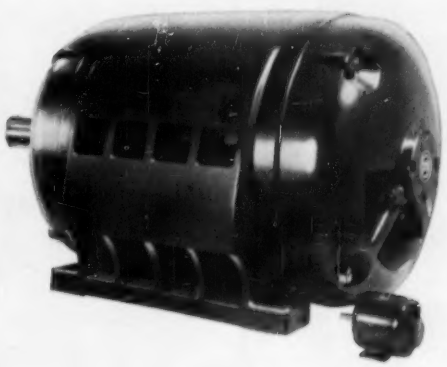

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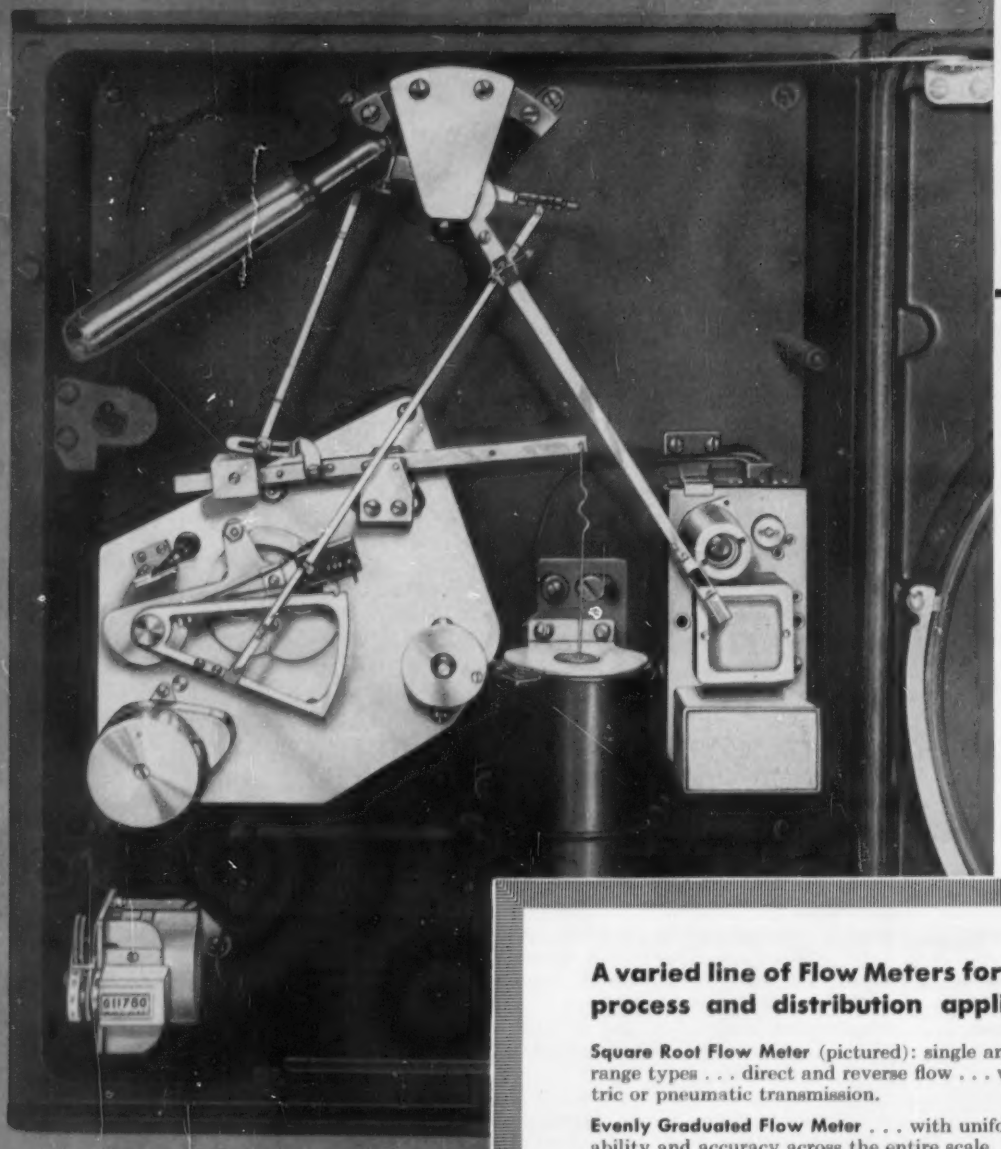

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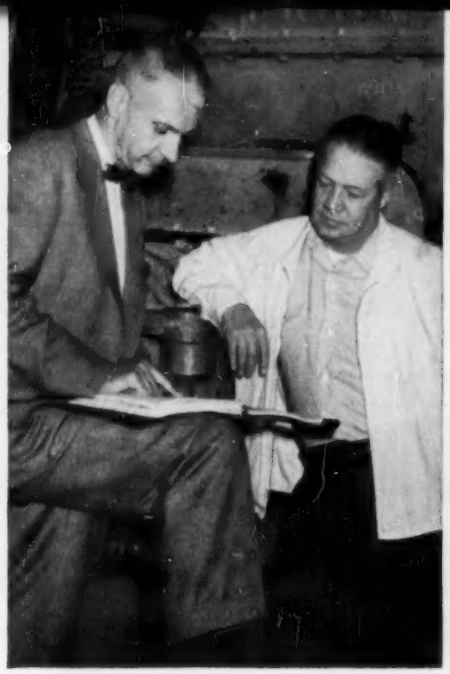
STRIP FEED PRESSES



A. D. Schnurr (right), Kalo Brick & Tile Company president and Standard Oil lubrication specialist Roland C. Bleimehl discuss plant lubrication requirements. Providing technical service on lubrication is something for which "Rollie" Bleimehl is well qualified. Rollie is a mechanical engineer with a degree from Iowa State College and a graduate of the Standard Oil Sales Engineering School. He's been an industrial lubrication specialist for 10 years with the Standard Oil Company. Customers find his experience and training pay off for them.

Large open gear, such as this one in Kalo Brick & Tile plant, suffered excessive gear tooth wear until their Standard Oil man suggested switch to CALUMET Viscous. New lubricant eliminated throw off, reduced gear replacement and maintenance.

CALUMET Viscous Lubricant solves gear lubrication problem for Kalo Brick & Tile Company

Long-time Standard customer receives another demonstration of effectiveness of Standard Oil Products and technical service.

The Kalo Brick & Tile Company, Fort Dodge, Iowa was experiencing trouble with the lubrication of open gears. The lubricant used lacked adhesive qualities and was being thrown off resulting in excessive gear tooth wear. In addition, the lubricant had to be heated before application.

As they had done in so many cases during sixty-five years as a Standard Oil customer, Kalo management called in a Standard industrial lubrication specialist. Inspection and recommendation by the Standard man resulted in a switch to CALUMET Viscous Lubricant for open gears. Kalo Brick & Tile Company got these results: gears received an effective shield that did not throw off, life of gears was lengthened and lubrication maintenance and attention greatly reduced, no preheating of CALUMET Viscous Lubricant was required so this messy job and the preheating equipment were eliminated.

No matter what the problem, chances are Standard Oil lubricants and technical service can help you solve it. Try them. Call your nearby Standard Oil lubrication specialist in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Kalo Brick & Tile Company plant, Fort Dodge, Iowa found solution to gear lubrication problem by using CALUMET Viscous Lubricant.

Quick facts about
CALUMET Viscous Lubricant

- **Not a residual product but a true grease carefully manufactured from selected soaps, oils and additives.**
- **Good wetting ability. Gives lubricant superior adhesiveness, makes it resistant to washing.**
- **Has very high load-carrying capacity. CALUMET Viscous grease formula is especially designed to provide effective shield under heavy load.**
- **Resistance to heat. Since it is a true grease compound, CALUMET Viscous has extreme stability, does not thin out under high heat.**

STANDARD

STANDARD OIL COMPANY
(Indiana)

There's no need for your rigid quality control measures to end when your product leaves the plant on its way to your customer. Not when you ship in USS Steel Drums. That's because every USS Steel Drum is carefully processed to insure *your* product purity.

To provide this type of protection from contamination, every trace of grease and dirt is removed from the drum body and ends with a strong alkali solution. With all impurities removed, the interior and exterior are thoroughly saturated with a special phosphate formula that gives long-lasting protection from rust. Take advantage of our concern for your product. Plan to give your products the important protection of "quality-controlled" shipping.

USS Steel Drums are available in capacities from 2½ to 110 gallons, either plain or decorated. They have a wide variety of openings and fittings.

"It's Better to Ship in Steel"

UNITED STATES STEEL PRODUCTS
DIVISION
UNITED STATES STEEL CORPORATION
DEPT. 616, 30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
Los Angeles and Alameda, Calif. • Port Arthur, Texas
Chicago, Ill. • New Orleans, La. • Sharon, Pa. • Camden, N. J.

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

USS STEEL DRUMS

USS

UNITED STATES STEEL

SERVING INDUSTRY WITH "COLLOIDS OUT OF THE SEA"

SeaKem EXTRACTS

An ADVERTISEMENT by and about SEAPLANT CHEMICAL CORPORATION of New Bedford, Mass.

"MOUTH FEEL"

We dearly wish that we could impose a slide rule or a graph on this advantage because we've seen it do wonders for many thin and flat tasting liquids, as well as those with sharp or harsh peak flavors. But it's entirely a subjective reaction so we can report only what people tell us who have tasted, both with and without SeaKem Extractive, products like certain soft drinks or thin or cold soups—or even cocktail mixes made with unaged whiskey.

People pressed into service on our "taste panel" tell us that the physiological effect on the tongue is what the singing commercial exalts as "rich, full body." (See what we mean about wanting a slide rule?) Being more technical than talented with words, our descriptive phrases don't "fall so trippingly from the tongue" but we do know from hard reality that people definitely prefer this advantage of "mouth feel" in certain products.

At the same time, this improvement obtained with Our Product is not necessarily associated with increased viscosity, although this effect can be achieved if desired. Generally, a producer prefers to bring about desirable "mouth feel" without altering the external appearance of the product (increasing viscosity).

Along with this richer, fuller (apologies to the copywriters) "mouth feel" is a mellowing of flavors usually attributed to an aging process. There seems to be a more complete blending and retention of flavor. Possibly the blending is due to the property of retention. There is also the cutting off of harsh notes, usually associated with aging.

If you want a startling example of what we've haltingly tried to put into words, try the following experiment on someone who's a connoisseur of good whiskey. Take a popular, low-cost cocktail mix that you know to be harsh tasting, give your friend a sample without identifying the product. Then give him a sample of the same product to which has been added 0.1% by weight of SeaKem Type 8 Stabilizer.* We'll bet you the cost of the cocktail mix that your friend will swear the second drink has been made with aged whiskey. It will both look and taste like it has. NOTE: Confirming repeat tests are not valid beyond the fifth test by reason of a peculiar clouding effect on the subject's ability to render objective judgment. (Item No. 161)

BETTER ANOTHER TIME PERHAPS? *Ed.*

*A little trick is needed to obtain solution because of the alcohol content. Make a 1% solution of the extractive in 10% of the cocktail mix by heating to approximately 140-deg. F. Cut back into the remainder of the cocktail mix to give the final product a concentration of 0.1%.

Quickies

- The items on these pages are from recent issues of our house organ, published under this same SeaKem EXTRACTS masthead . . . regular issues also included technical discussions pertinent to colloidal problems . . . To be put on mailing list, just check the coupon on page 3.
- Known more familiarly as Irish Moss extractives, nature has provided an abundance of the source material from which SeaKem "Colloids Out of the Sea" are derived—and years of experience have proved the usefulness of these red sea plants in gelling, thickening, emollient and demulcent applications. . . . However, real growth had to wait until modern technology could unscramble the intricacies of producing—on a tonnage basis—uniform, tailor-made extractives derived from an incredibly complex source material . . . Today, SeaKem Stabilizers are contributing important advantages to more than a hundred different food products ranging from chocolate milk and ice cream to salad dressings and frosting mixes.
- A more complete presentation of Our Story is available in an 8-page brochure entitled "Colloids Out of the Sea" . . . yours for the asking by checking the coupon on page 3.

Hot News on Hot Meringues

One of the food publications carried a story a short time ago which pointed out that recent research has indicated that the hot meringue process can result in a very significant pasteurizing effect and that this, in turn, with proper formulation, can prevent bacterial growth after the meringue has cooled.

(Please turn the page)

Use convenient coupon on page 3 to check items on which you want more information.

HOT NEWS (Cont.)

This, we think, adds up to a very good sales point for Bakery Supply Houses. And to make their lot easier and more profitable, Seaplant has devised the following "Hot Process Meringue Stabilizer Package" which is yours for the asking. We supply everything but the customers. However, by pointing out the advantage of safety and purity with hot process meringues, we predict that alert supply houses will have no trouble on this score.

The "Package" consists of:

1. A complete and simple formula for hot process meringue stabilizer consisting of Cane Sugar, Cornstarch, Corn Sugar and SeaKem Type 202 Stabilizer.

2. SeaKem Type 202 in 200 lb. drums, all standardized and ready-to-go.

3. Complete directions for blending the over-all stabilizer in bulk, then packaging in small units for sale to the bakeries.

4. Directions for the bakeries, in turn, to use the packaged stabilizer in their hot process meringues.

Further details are available for the asking. **(Item No. 162)**

Custard-Type Pies

Interested in custard-type pies?—like Mama used to get at the neighborhood bakery? So are we. In fact, we'd prefer eating a slice in our cool back yard right now, rather than writing about our famous formulas. But write we must—so hark!

At your request we'll be glad to dispatch, via the U. S. of A. mails, suggested starting formulas for custard-type pies that are:

1. Easier to prepare (no critical temperature).
2. More uniform in texture; better tasting.
3. Fast setting and non-running.
4. Without surface skin, pastiness or starchy flavor.
5. No SALMONELLA problems.

(Item No. 163)

Keeping Fish Fresh

Seaplant doffs its hat, this issue, to the Research Division of the American Cyanamid Co. at Pearl River, New York.

Very briefly, Cyanamid scientists have found chlortetracycline to be effective for the preservation of meats and fish. They suggested chlortetracycline, known more familiarly as aureomycin, could be incorporated into the ice used to preserve the fish and thus freshness could be assured for much longer periods of time than at present. Practically speaking, that means that fishing boats, for instance, could stay at sea much longer without danger of spoilage of the catch.

But, there was a hitch in this reasoning.

When you freeze water containing an antibiotic, severe migration of the antibiotic toward the center of the ice block occurs. Thus, if the antibiotic migrates two inches toward the center of a standard 300 lb. ice cake, 50% of that ice will then contain no antibiotic at all. Obviously, this won't do.

The problem, then, was one of forming a mixture which would be homogeneous when frozen.

To that end, Cyanamid carried on a good deal of developmental work with many of the commercial hydrocolloids and Our Product, Irish Moss Extractive or carrageenin.

Cyanamid learned two things:

1. The substances effective in controlling migration contained acidic groups, which conferred on them salt-forming properties with metals. In other words, metallic ions in the water were involved in the complex formation which prevented migration.
2. No other hydrocolloid worked as well as Our Product, SeaKem Type 9.

Forgive us for appearing to boast. All of the credit for this pioneering work with its far-reaching significance belongs to the men of Cyanamid. Results were presented before the Fishery Industries Meeting in Havana, Cuba, December 1954, in a paper entitled: *A Practical Method of Dispersing Aureomycin Chlortetracycline in Ice by S. D. Upham, F. E. Stirn, J. F. Weidenheimer, F. M. Callahan and L. Ritter.*

If we may quote from that paper:

"It was expedient that a polymeric material which could be dissolved in cold water be found. Carrageenin proved most suitable. 180 mgm. of chlortetracycline HCl and 1.0 gm. of carrageenin (SeaKem Type 9) were dissolved in six liters of tap water by stirring at room temperature. The sol was then completely frozen at 10°C.

"After removal of the cake from its container, the cake was inspected visually and it became easily discernible that a homogeneous dispersion had been obtained. Analysis of the innermost sections proved that an existing ratio of 1.0:1.0 had resulted." **(Item No. 164)**

Thin When Hot Viscous When Not

One of the most desirable characteristics of Our Product, we find, is its ability to form thermally-reversible gels. Thus, within limitations you can have either a gelled or liquid product as you wish—and you can convert from one state to another and back again *ad infinitum* simply by changing the temperature. In addition you can have your product gel or melt at any temperature you wish between 62° F. and 152° simply by adding safe, edible and easy-to-use potassium chloride or some other cation to your solution.

This thermally-reversible gel characteristic has a great many practical applications in food processing, we find. One of them is the retorting of canned goods, pie fillings, white sauces and many more. Such a product containing SeaKem Stabilizer will have very little body when hot. Thus the convection of the liquid will be greater or, put another way, the heat penetration will be better. This is not true of some other thickeners which keep the product viscous even when hot, thus retarding heat penetration. At the same time the product with SeaKem Stabilizer, when used by the housewife some time later, will have the desired body or consistency by reason of the lower temperature at which it is served. **(Item No. 165)**

Use convenient coupon on page 3 to check items on which you want more information.

"Which Twin Has "It"?

The only difference in the two samples of Maple Cream above is one-tenth of one percent SeaKem Type 3. The samples have been standing now for about six months, and as is evident, the untreated sample has separated. In control tests at our laboratories, separation began in the untreated sample after one week, and after two months had advanced to ¼" at room temperature and ½" at 37° C. The sample containing SeaKem stabilizer showed little or no separation in all cases.

The results: now when tourists drive through New England and see the friendly signs for Maple Grove products "Vermont's Finest Confections," they'll be greeted by products that look as appetizing in their glass houses as they taste.

Can we produce similar results in the case of your "shelf-life" problems? Why not tell us what they are and let us try? **(Item No. 166)**

Carrageenin's Chemistry

One way our business is different from others is that our kind of specialized product requires that we try to help our customers understand the proper functioning and use of Irish Moss Extractives.

A case in point is the so-called "protein" or "milk" reaction. Modest though we may be, you'll never see us take a back seat where Our Product is used in conjunction with any kind of high protein product such as milk. We think it's pretty sensational, f'rinstance, when one-third of a pound of SeaKem Stabilizer in 1,000 pounds of chocolate milk does a perfect job of holding the chocolate fibers in permanent suspension. Similar results hold true with ice cream and icings and puddings and many other products containing milk or protein.

We've been keeping track of the work that the world's top authorities are doing in this area and we're proud to say that some of them are on our team. We're doing research in New Bedford, too, on the interaction of SeaKem Stabilizers with proteins.

One of the things we've learned is that it's important to think in terms of the chemical interaction of the complex carrageenin molecule (negatively charged polymer, average molecule weight around 200,000) with an even more complex protein molecule. We don't know precisely what happens but it has something to do with the fact that carrageenin and proteins are both polymers which can interact between themselves and each other by a number of different mechanisms. The result is a larger polymer which becomes less and less "soluble" until a gel or other form of precipitate is obtained. This interaction probably takes place through a number of mechanisms involving: ionic bonding; hydrogen bonding; and van der Waal's forces.

A few more details are available in a memorandum which can be secured by checking this item on the coupon below. But more important (whatever you do) don't ever close the door on any stabilizing problem involving protein molecules without first investigating SeaKem Irish Moss Extractives. **(Item No. 167)**

did you know?

. . . that SeaKem "Colloids Out of the Sea" are uniquely different both in their reactivity with proteins and their ability to work well "in combination" with other colloidal materials.

. . . that because of their reactivity with milk in any form, soya and egg proteins, very small amounts of a SeaKem Stabilizer often will react with, and thus bring into more effective play, naturally-present ingredients, making possible formulation accomplishments and production economies users call "incredible".

. . . that SeaKem Stabilizers can be used as "tool" ingredients "in combination" with other colloidal materials (starches, locust bean gum, carboxymethylcellulose, etc.) to build behavior and advantages which cannot be obtained from any one of these ingredients alone.

SEAPLANT CHEMICAL CORPORATION,
63 David St., New Bedford, Mass.

Gentlemen:

Please send me more information on the following items:

161 ☐, 162 ☐, 163 ☐, 164 ☐, 165 ☐, 166 ☐, 167 ☐.

Please send me your "Colloids Out of the Sea" brochure ☐.

Please put me on your SeaKem EXTRACTS mailing list ☐.

Please send me information on the following application: _____

_____

Your Name: _____ **Title:** _____
(Please print)

Firm Name: _____

Address: _____

City and State: _____

Use convenient coupon above to check items on which you want more information.

This is Why the Nash is the Most Simple Compressor

It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

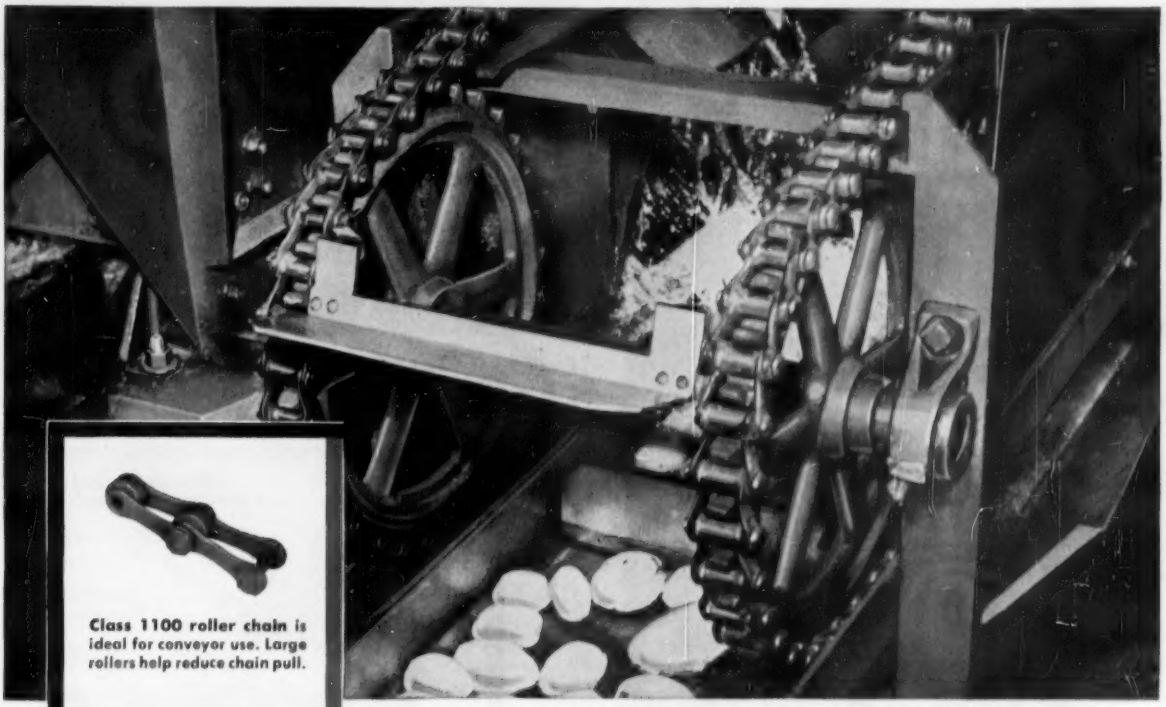
Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY
313 WILSON, SO. NORWALK, CONN.

Here's a WHOLE RANGE of chain for low-cost food conveying

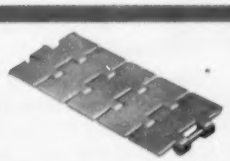


Inherent strength and durability—plus closed joint construction to eliminate entry of foreign material—make Link-Belt Class 400 pintle chain ideal for this flight conveyor handling peeled potatoes. Link-Belt sprockets, ball bearing pillow blocks and steel safety collars are other components of the conveyor.

Class 1100 roller chain is ideal for conveyor use. Large rollers help reduce chain pull.

Class 400 Swivel Chain

Universal Crescent Flat Top Chain



S-815 Flat-Top Conveyor Chain

Get the RIGHT one from LINK-BELT'S complete line

WHAT'S the best chain for your particular conveying needs? The Link-Belt line is providing the right answer throughout the food industries.

Link-Belt offers low-cost chains for light conveying jobs . . . high-strength, durable chains for toughest applications. Choose from several types for maximum sanitation. For drag chain installations, other types with ample sliding surfaces are available. And all can be economically adapted to specific service through Link-Belt's wide selection of versatile attachments.

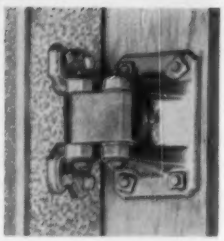
Near you is a Link-Belt office or authorized stock-carrying distributor where you can learn the facts about Link-Belt's complete line of chain for sure, steady conveying and drive service. From either, you'll get a reliable recommendation that will meet your requirements exactly.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 15); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,914

For The Finest Cold Storage Doors Specify JAMISON with these exclusive features



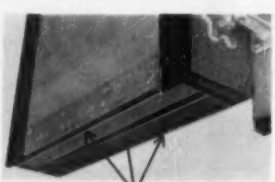
Exclusive JAMISON Hardware

- Rugged cast construction
- Patented heavy duty design
- Adjustable hinges and fastener assure tight seal during life of door
- Hot dip galvanized finish. Heavy coating of prime zinc gives maximum protection.

Exclusive JAMISON FROSTOP (optional feature)

- Prevents frost or ice on door frames even as low as —50°
- Prevents door from freezing shut, eliminates damage from forcing open frozen doors
- Assures tight seal at all times, prolongs gasket life.

ZEROSEAL GASKET



TRIPLE SILLSEAL GASKET

Exclusive JAMISON Gasketing

"Zeroseal"

- Wide, flat seal
- Extends around sides and top
- Extra resilient and pliable

"Sillseal"

- Triple Wiper Seal
- Flexible, abrasion and grease-resistant
- No capillarity

Full details on the Jamison Super Freezer Door are contained in Bulletin #5. Write for your copy to Jamison Cold Storage Door Co., Hagerstown, Md.

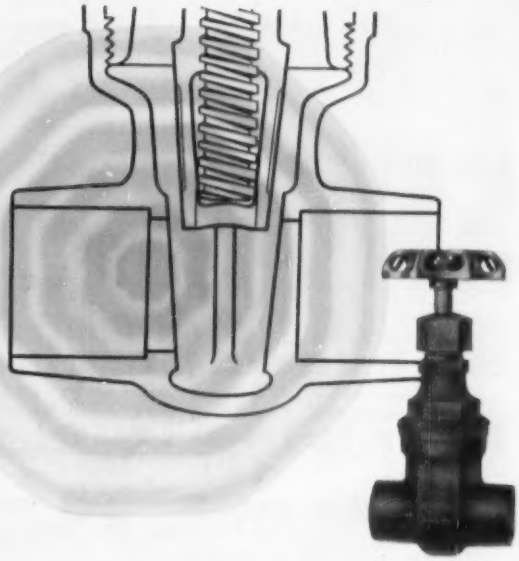
JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

When the heat's on

you need the extra strength of JENKINS Solder and Socket End VALVES



Solder End GLOBES and ANGLES

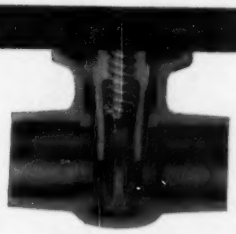
300 lbs. O.W.G.
¼" to 3"

Fitted with Renewable Composition Disc.

Solder End GATES

225 lb. and 300 lb. O.W.G.
⅜" to 3"

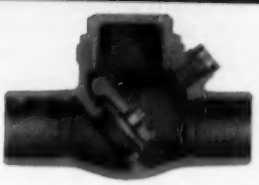
With solid or split wedges, and stationary or traveling spindles.



Solder End CHECKS

300 lbs. O.W.G.
¼" to 3"

Regrinding. May be easily reground without removal from line.



The "light-duty" look of copper tubing installations is deceiving. Valves must provide an accurate fit to tubing and *hold it* under the intense heat of soldering. And, because flexible tubing does not afford the rigid support of standard pipe, valves must withstand unusual strains in operation.

Jenkins Solder End Valves are engineered to meet these demands with strength to spare. High tensile bronze castings have liberal dimensions for extra rigidity. Smooth, clean bores assure accurate fit, easy soldering, positive seal to types K, L, and M Copper Tubing.

For faster, trouble-free installation, and lasting economy, specify Jenkins Solder End Valves. Jenkins Bros., 100 Park Ave., New York 17.

JENKINS Socket End Valves for Class B or IPS Tubing

Jenkins bronze valves with socket ends for silver-brazing are made in Globe, Gate, and Swing Check patterns to control compressed air, hot oil, and similar fluids in tubing hookups where specifications call for permanent, leakproof joints. Complete information in the Bulletin offered below.

NEW BULLETIN Lists all Jenkins Solder End and Socket End Valves and gives complete instructions for soldering and brazing. Ask for Solder-Socket End booklet.

JENKINS VALVES

LOOK FOR THE JENKINS DIAMOND

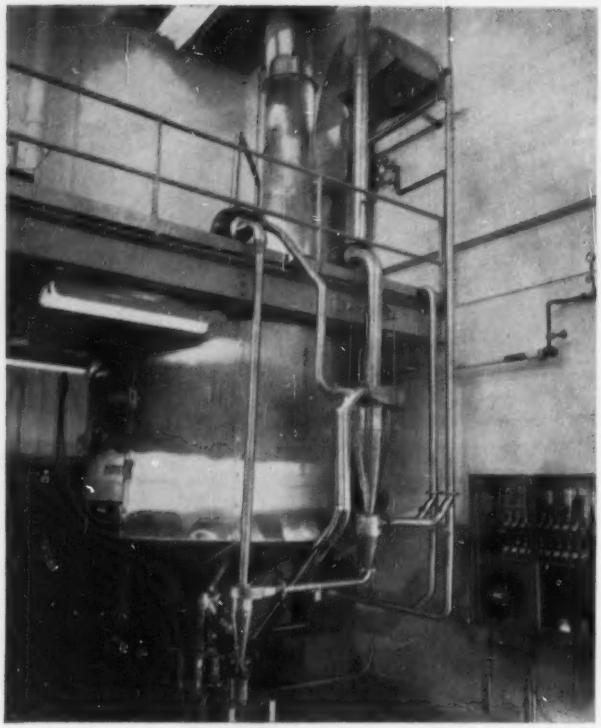
SINCE 1864 TRADE JENKINS MARK

Jenkins Bros

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS

ENDURO®

Stainless Steel Maintains True Flavor of Food Concentrates



Republic ENDURO Stainless Steel has been the long-time friend of food engineers responsible for product purity and production. It was only natural, then, that stainless steel equipment was chosen for processing a relative newcomer to the food industry, concentrates.

Good examples of this type of equipment are the stainless steel spray dryer shown above and evaporator illustrated at right, manufactured by Rodney Hunt Machine Co., Orange, Massachusetts. The evaporators are used in making coffee, tea and fruit juice concentrates. Also for processing gelatin, tomato paste, caramel, concentrated milk and edible dispersants such as lecithin. The spray dryer is used to process coffee, milk, egg whites, and flavors.

Quality and true flavor of the product are maintained because the material being processed comes in contact only with stainless steel. There is no danger of metallic contamination. ENDURO Stainless Steel does not add unwanted flavor to food products. It never takes anything away. And it's so easy to clean and keep clean because it's solid stainless steel. There's no applied surface to chip, peel or wear away. ENDURO's hard, smooth surface offers little foothold for contaminants.

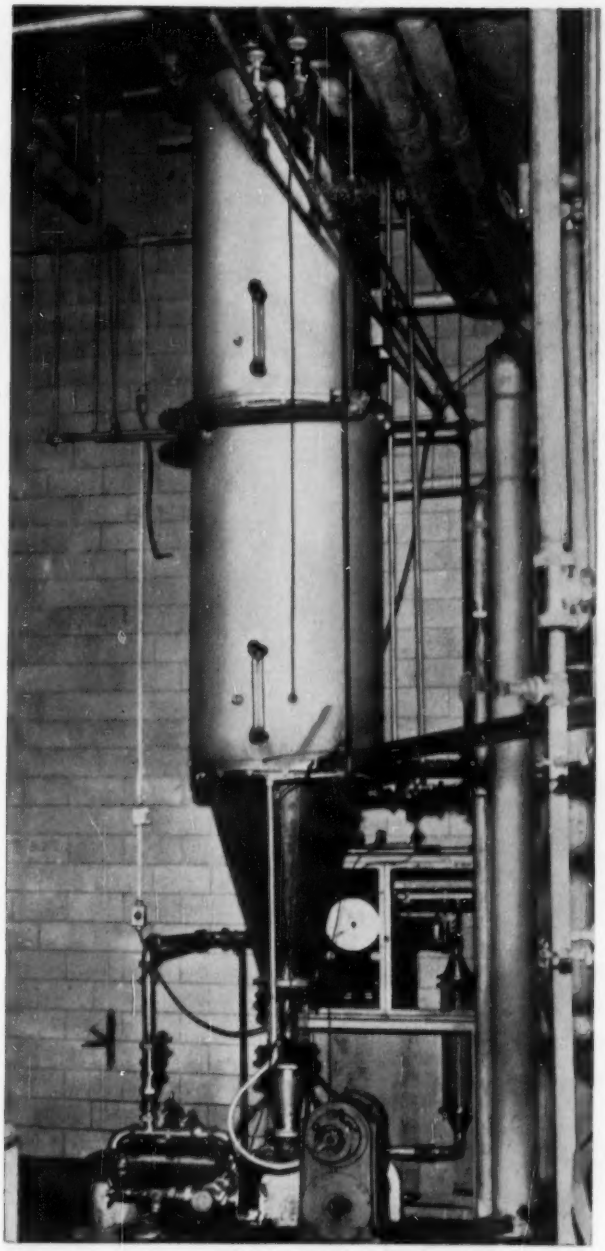
Strength, heat-resistance and corrosion-resistance are more advantages of ENDURO-made food processing equipment like the evaporators and dryers mentioned above. These units, designed to operate at temperatures from below freezing to over 750°F, are made in thinner, lighter sections because of ENDURO's high strength-to-weight ratio. And they hold their strength, toughness, and corrosion-resistance all the way from below freezing to blistering heat.

Safeguard the purity and quality of your food products by using equipment made from Republic ENDURO Stainless Steel. Ask your supplier for more facts. Or send coupon for additional information.

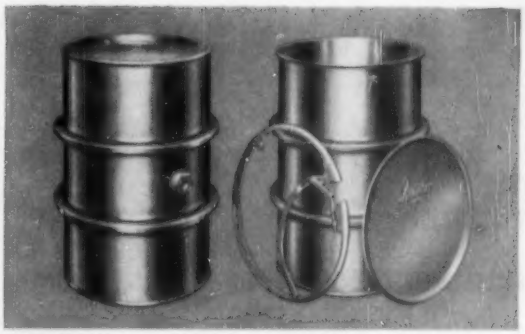
REPUBLIC

REPUBLIC STEEL

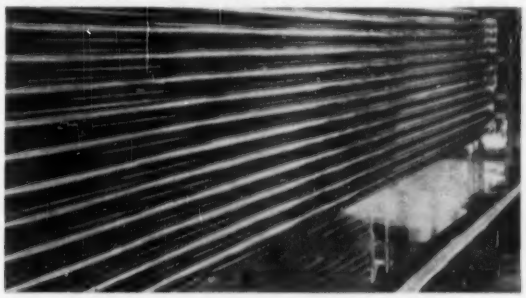
World's Widest Range of Standard Steels



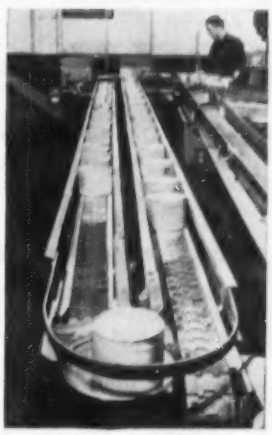
The Rodney Hunt Turba-Film Evaporator concentrates liquids continuously at a high rate of speed. Foods, such as coffee or fruit juices, are condensed with the flavor preserved because the product has only a brief exposure to heat and comes in contact only with stainless steel.



MAINTAIN TRUE FLAVOR of your food products by shipping or storing them in drums and barrels made of ENDURO Stainless Steel. They'll give maximum protection against product contamination. ENDURO resists corrosion. Resists hard use and abuse. Never needs painting. Many styles to choose from in sizes up to 55 gallons.



FOOD, BEVERAGES AND DAIRY PRODUCTS receive positive protection against discoloration and contamination when transported through ELECTRUNITE® Stainless Steel Tubing and Pipe made by Republic's Steel and Tubes Division. ELECTRUNITE Stainless Steel Tubing and Pipe last years longer because they are corrosion-resistant and have a wide range of resistance to temperature, pressure and physical damage.



SEND YOUR PRODUCT TO MARKET in cans made from Republic Tin Plate. Electrolytic Tin Plate is made by the cold reduction process which gives all the qualities necessary for making tin containers on high-speed automatic machines. Black plate is also available for such things as lacquered cans. Send the coupon for more information.

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...the ideal evaporator for concentrating viscous, foaming, and heat-sensitive liquids

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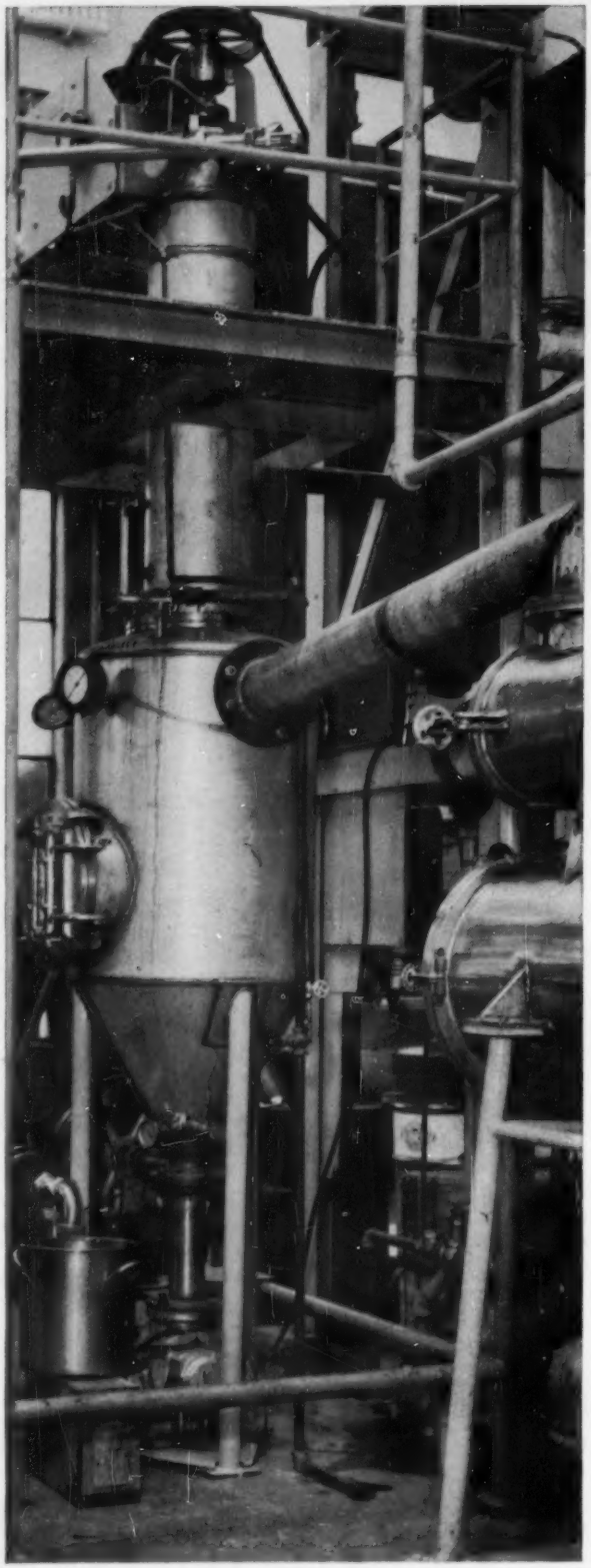

This new downflow-type evaporator combines several features that make it the *ideal* concentrator of heavy, viscous, heat-sensitive, and some foamy liquids. It operates on a single pass basis, embodying an agitated film feature. The liquor and the vapor pass vertically down the central vaporization tube in a high degree of turbulence and are discharged at the lower end into an efficient vapor and liquor separator. Tendency for a thin layer of stagnant liquor fouling on the heating surface thus is eliminated. The cycle is completed in the shortest time possible. The heaviest, most viscous liquids can be carried rapidly to extremely high concentrations in the Roto-Vak Concentrator.

A pilot-plant size Roto-Vak Concentrator is installed in the Blaw-Knox Research and Testing Laboratory. We shall gladly make a test run with some of your liquid and report on the results. We invite your inquiries.

A COMPLETE PROCESS EQUIPMENT SERVICE

Evaporators of every description constitute but one phase of Blaw-Knox Process Equipment design, engineering and fabrication service for the chemical, food, pharmaceutical, plastic and resin, petroleum, rubber and other industries:

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... better products through cellulose chemistry

by OLIN MATHIESON

The name FROSTKRAFT is the newest "package" in high-strength kraft products — shipping containers, multi-wall sacks, grocery and specialty bags.

The Forest Products Division of Olin Mathieson Chemical Corporation has created a new combination of resources, facilities and know-how . . . united behind the product name — FROSTKRAFT! To the great Frost timber and lumber industries have been added the recently acquired kraft paper operations of the former Brown Paper Mill Company, Brown Container Corporation, Brown Paper Industries, Inc., Krafco Container Corporation and Negley Bag and Paper Company.

Olin Mathieson brings to FROSTKRAFT many years of intensive research and leadership in cellulose chemistry . . . scientific packaging . . . basic industrial chemicals. This unique combination of resources and industrial skills is now being applied to the continued development of FROSTKRAFT paper products.

FOREST PRODUCTS DIVISION OLIN MATHIESON CHEMICAL CORPORATION
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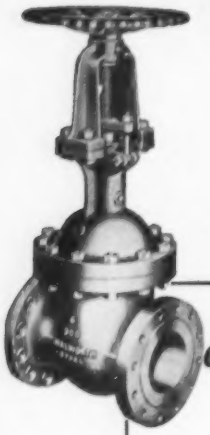
Cast Steel Gate Valves

Series 150 and 300

Wedge Gate — Outside Screw and Yoke



Sectional view of Series 300

Big 8-Point Superiority!

Gland clearances are such that stem cannot be scored if gland should be tightened unevenly.

Deep Stuffing Boxes in all sizes (2″ to 24″) insure tightness and maximum packing life – costly leaks are eliminated.

Bonnets and Bodies are engineered to withstand pressure and minimize distortion – they're tough, durable, dependable.

Heavy Steel Walls provide extra strength and longer life.

Integral Body Guide Rib Faces are machined to insure accurate disc seating.

Seat Rings are bottom seated – not flange type. No recess exists at back of ring – hence no turbulence, erosion, or pressure drop.

Streamlined Ports allow high velocity, non-turbulent flow, and reduce the possibility of erosion.

Valves regularly have flanged ends. They can be supplied with ends for butt welding. Roller bearing yokes are available. On valves 5 inches and larger, by-passes can be furnished.

For Series 600 and higher, we recommend Walworth Pressure-Seal Steel Gate Valves.

For further information on Walworth Cast Steel Gate Valves, see your local Walworth distributor, or write:

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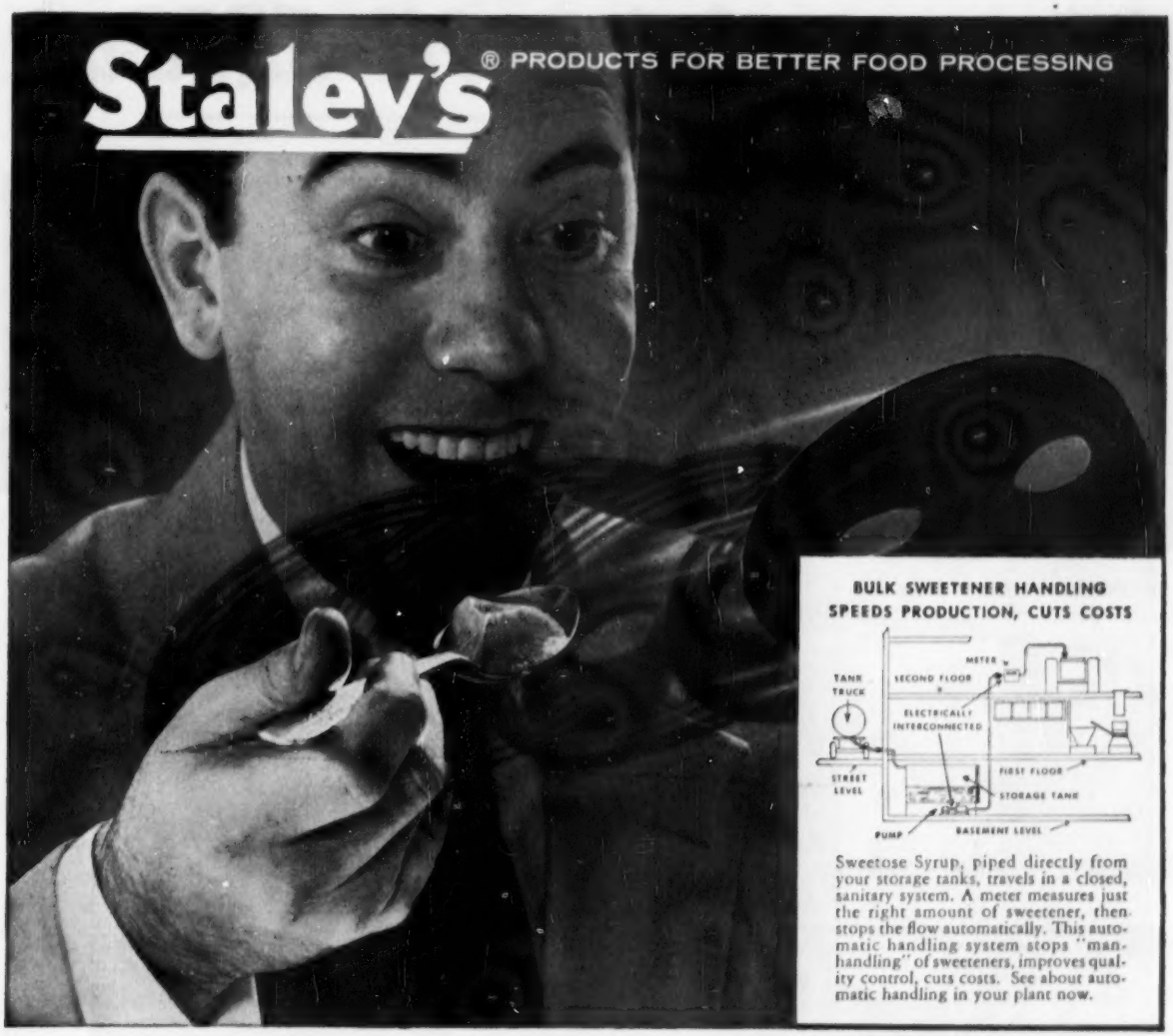
Staley's® PRODUCTS FOR BETTER FOOD PROCESSING



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Sweetose Syrup, piped directly from your storage tanks, travels in a closed, sanitary system. A meter measures just the right amount of sweetener, then stops the flow automatically. This automatic handling system stops "man-handling" of sweeteners, improves quality control, cuts costs. See about automatic handling in your plant now.

Sweetose *never* masks a flavor!

Crystal clear, Sweetose syrup brings out full, fine flavor, retains natural color, improves texture.

Want to give your processed foods a real profit-building competitive advantage? You can . . . with easy-to-use Sweetose, Staley's enzyme-converted corn syrup. Used with sucrose, Sweetose gives accurate sweetness control that means well-balanced, unmasked, delicious flavors. This remarkable liquid sweetener helps retain fresh, natural color and body and greatly improves the eye appeal of your products. Try Sweetose in your products soon, and prove its sales-building advantages to yourself. See your Staley representative or write us direct for more information.

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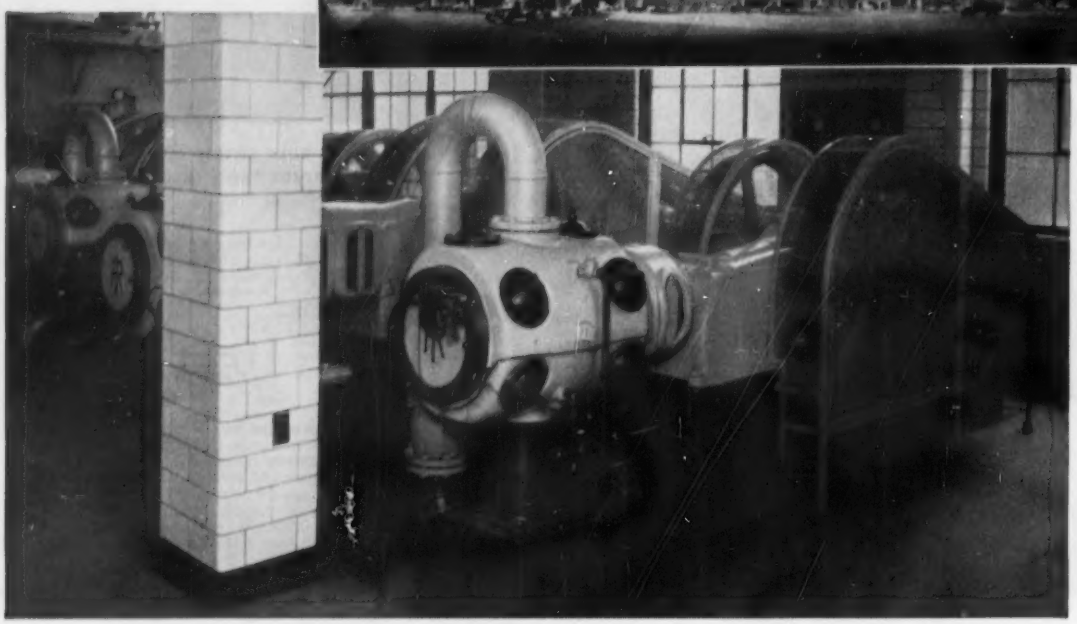

Ingersoll-Rand Class ES Compressors with NL (non-lubricated) cylinders provide all plant and process air at one of America's largest and finest breweries

It takes a lot of air to operate a big, modern brewery — air for instrumentation, weighing, conveying, bottle capping, plant maintenance and movement of beer in preliminary processing. And any air that comes in contact with the beer or its ingredients must be *absolutely free of oil.*

The non-lubricated compressor was pioneered and developed by Ingersoll-Rand Company and it was here at Schaefer's, more than 20 years ago, that one of the first of such units was installed. Self-lubricated dry carbon rings eliminate the need for any oil in the cylinder or packing, keeping the air entirely free from contamination. Three more ES compressors with NL cylinders were installed later, and now all four of them are in daily service, as shown in the photo above at the Brooklyn plant of America's oldest lager brewers.

Wherever oil-free compressed air is needed, it pays to specify Ingersoll-Rand NL cylinders. Write or phone for complete details.

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ROCK DRILLS • COMPRESSORS • AIR TOOLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • OIL & GAS ENGINES

To the man who's thinking about buying a new truck:

maybe you're missing something...

➢ And what you're missing is more than "maybe," it's for *sure*—if you haven't yet visited your Dodge truck dealer.

➢ Do you want to miss a *rock-bottom price?* Perhaps you haven't realized that Dodge trucks actually cost *less* than you'd pay for corresponding models of most other makes.

➢ Do you want to miss *power* so high it leads the field? Consider this: with engines of 169 to 175 horsepower, Dodge overpowers *every other leading make of truck* in the low- and medium-tonnage fields.

➢ Surely you don't want to miss the many advantages of *"Job-Rated."* Because all units from engine to rear axle are engineered and matched for a specific job, the Dodge truck you buy is exactly *right* for your business.

➢ You don't want to miss Dodge safety—which includes the biggest wrap-around windshield of any truck on the road, the shortest turning radius. Or Dodge superior cab comfort . . . Forward Look Styling.

➢ In short, you get a whale of a lot more truck for a good deal less money than you think! Stop in and see your Dodge truck dealer right away—don't miss *anything!*

DODGE Job-Rated **TRUCKS**
WITH THE *FORWARD* LOOK

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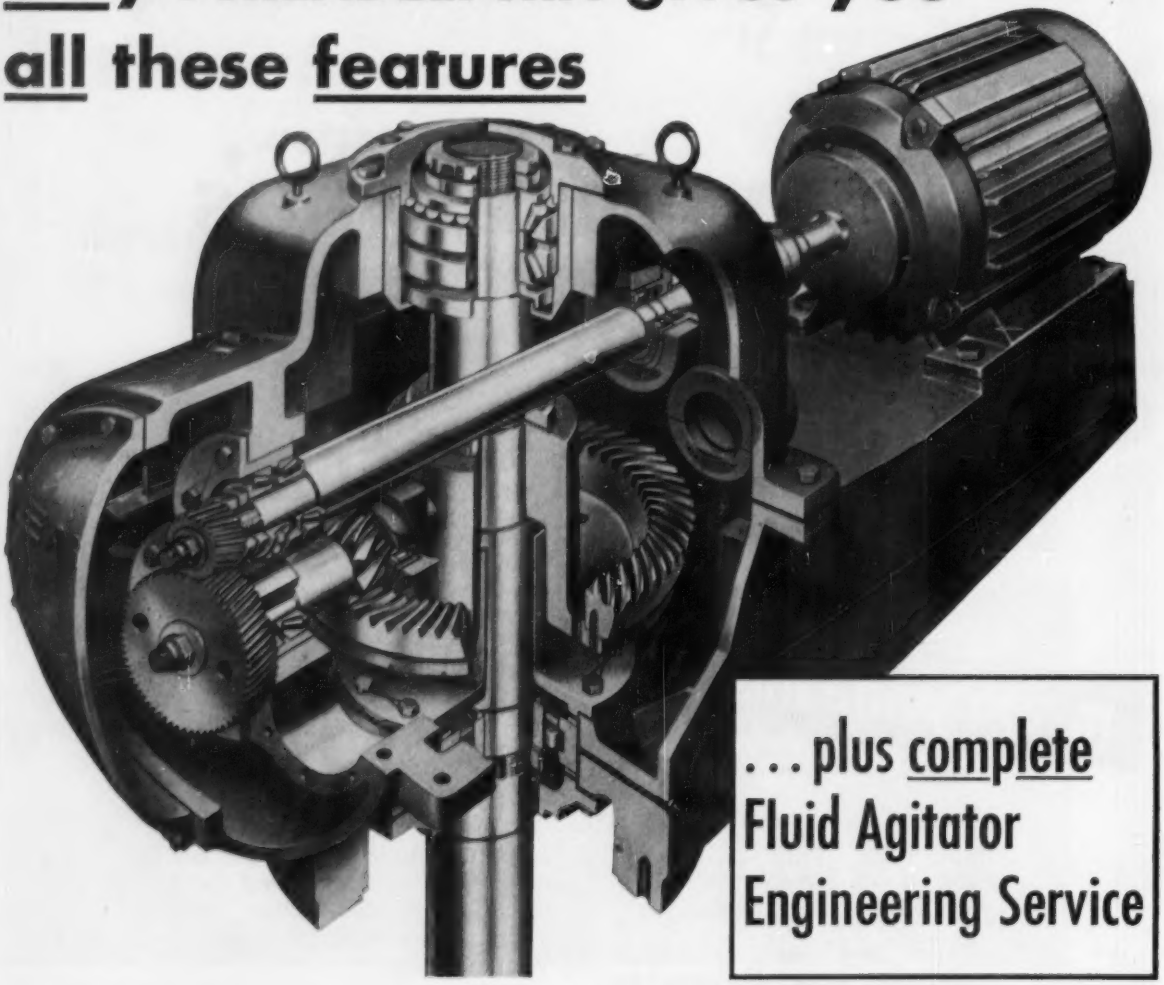
only PHILADELPHIA gives you all these features



. . . plus complete Fluid Agitator Engineering Service

Now, for the first time one manufacturer is able to offer a completely integrated, "packaged" fluid agitator service. No other manufacturer controls, within its own organization, such extensive and specialized designing, engineering, manufacturing, assembling, testing, and field servicing facilities devoted exclusively to fluid agitator production. Philadelphia Gear Works manufactures impellers, shafts, drive supports, all gears, and reducer housings. Only Phillie Gear can offer you the complete solution of your fluid agitator problems —through one centrally-controlled, thoroughly responsible source.

Our engineers are familiar with the requirements of all types of process mixing and fluid agitation applications.

Philadelphia Gear Works products have "measured up" through 63 years of industrial leadership. Compare the new Philadelphia Fluid Agitators for economy, efficiency and quality. See for yourself why Philadelphia Fluid Agitators are your very best investment.

COMPARE THESE FEATURES: Exclusive Philadelphia Low Head Room Design—maximum bearing span with minimum headroom ● Helical Change Gear Set, within housing, allows for ready selection of up to 14 different standard speeds ● Heavy Duty Thrust Bearings permit use of standard units for conditions of high pressure in closed tanks ● Large Heavy Duty Output Shafting results in less shaft deflection at stuffing box or mechanical seal, steady operation of long overhung agitator shafts ● Philadelphia Heavy Duty Inboard Bearing Support provides extra rigidity resulting in superior gear performance and life ● Spiral Bevel Gears of Hardened Steel, accurately lapped for long and quiet operation ● Field-proven Philadelphia Dry-Well Construction prevents oil leakage down output shaft ● Labyrinth-type seal on input shaft allows effective sealing with minimum friction ● Ask for Bulletin A2-55.

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Industrial Gears & Speed Reducers

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Established 1892

INTERVIEW *with Karl G. Layer, Distribution Manager, Sylvan Seal Company, Philadelphia*

How Sylvan Seal expanded into profitable ice cream marketing with an Armorply cold box

Armorply ends dairy's search for a clean, low-cost, adaptable unit

HUGE COLD STORAGE BOX that Sylvan Seal bought from Annapolis Yacht Yard is constructed on cement blocks. Besides being clean and dry, it kept the ice cream "brick hard" through the 1954 summer season – one of Philadelphia's hottest.

Q. When did your firm decide to buy a cold storage room?

A. In 1952 we reached a point where we required local storage facilities to expand in the Philadelphia, southern New Jersey and Delaware area. We decided at that time to purchase a freezer.

Q. Why did you decide on Armorply?

A. I had heard of other firms using Armorply for similar purposes, and talked to Erik Almen, president of the Annapolis Yacht Yard in Maryland, producer of Armorply boxes. I learned that an Armorply box is low in initial cost, that it is naturally clean, that it is easy to *keep* clean, and–very important reason to us – Armorply's panel construction makes it easy to add space to your cold box if necessary.

Q. Why was expandability such a major factor in your choice of Armorply?

A. As I say, we felt there was tremendous potential business for us in ice cream, and we were sure we'd soon have to increase our production. We wanted to be ready when the need for expansion arose, and we wanted the expansion to be easy.

Q. Have you expanded yet?

A. Yes, it wasn't long before we increased our storage box from 20′ by 40′ to 20′ by 96′. Another expansion to 50′ by 80′ brought its capacity up to 75,000 gallons of ice cream. Our first box held about 30,000 gallons.

Q. Have you ever moved your cold storage room?

A. Yes, when we expanded it the first time. It had been across from our plant, but the expansion made it too big for that space. So we moved it across the street to an addition built onto our plant.

Q. How did you go about moving your Armorply box?

A. Thanks to those panels, it was easy. We simply took down half the room, rebuilt it in the new location, then moved the second half across the street the same way. So we were able to keep at least half our box in use all the time.

Q. What recommendation would you make to other firms about Armorply?

A. Anyone interested in the same things we wanted – low first cost, easy maintenance, expandability – should buy an Armorply box.

• • •

Armorply is waterproof plywood with a metal face permanently bonded on either or both sides. Metals include steel, stainless steel, monel, aluminum, lead, copper and others. Armorply panels are light in weight, verminproof and impervious to moisture, remarkably strong and very easy to fabricate. Armorply also finds wide use for supermarket Kroger-type doors, counterfronts and countertops. Send the coupon for details and a free sample of Armorply.

SMOOTH WALLS AND CEILING of this Armorply cold storage box make cleaning easy. Panels were so easy to put together in building the box that Sylvan Seal employees who did the job said it was "like putting up a pre-fab house."

Weldwood® Armorply® Metal-clad plywood

A product of UNITED STATES PLYWOOD CORPORATION

WELDWOOD – The Best Known Name in Plywood

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Have your representative call on me with full details. ☐

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Acid foods, such as **chemical leaveners,** need this protection

Cutaway view of standard Pfaudler jacketed glassed steel mixing kettle. Smooth, acid-resistant glass surface stops corrosion and is easy to clean. Sticky products do not adhere to glass surfaces. Rigidly supported agitator maintains suspensions over a wide range of viscosity.

With the application of heat, some food ingredients, such as chemical leaveners, turn acid. Because of toxicity and flavor requirements, these products require careful processing.

As a means of avoiding product contamination and corrosion of the equipment itself, Pfaudler acid-resisting glassed steel kettles are made to order.

Resistant to most acids and alkalies up to pH 12 at 212° F., Pfaudler glass gives you remarkable processing flexibility. Should your leavening process change or if you desire to use a Pfaudler glassed kettle for processing some other acid product, no further equipment investment is involved.

Heat transfer and mixing efficiency are the equal of comparable types of equipment available today. This means that your operating costs will be in line. In addition, you get the added advantages of product protection and longer service life from the equipment.

Standard Pfaudler glassed steel kettles are available in sizes from 50 to 4000 gallons, giving you a wide range of selectivity at the lowest cost.

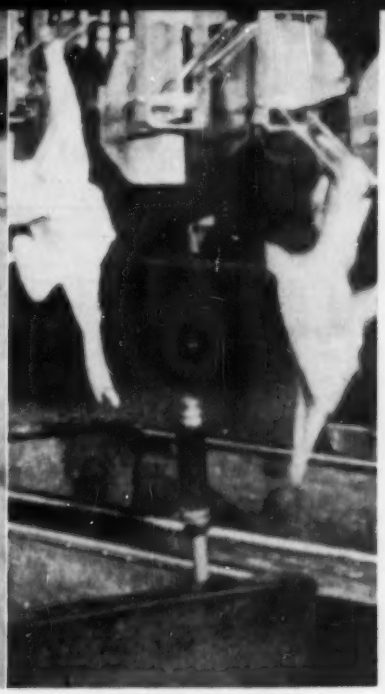
For all the facts, ask for Bulletins 860 and 920.

Corrosion resistance guaranteed!
Pfaudler offers a unique *one-year guarantee on the corrosion resistance* of glassed steel equipment to a wide range of acid conditions and alkali solutions in specific temperature ranges.

THE PFAUDLER CO., ROCHESTER 3, N. Y.

Antibiotic Is Dissolved

Poured Into Chill Tanks



Birds Drop Into Tanks

Antibiotic Introduced As Spoilage Inhibitor For Fresh Poultry

Then Are Packaged

Tests prove it effective for beef and fish, too. Defrost protection for frozen foods is possibility. And speculation runs to treatment of fresh fruits and vegetables—even whale meat

WILBUR H. MILLER

Director Industrial Applications, Fine Chemicals Division, American Cyanamid Co., New York City

First commercial use of an antibiotic in the processing of a perishable food became possible on an interstate basis on Nov. 30, 1955. On that date, the Food & Drug Administration cleared Aureomycin chlortetracycline for use "in and on uncooked poultry."

And formulated products containing a special food grade of the antibiotic, developed by the American Cyanamid Co., now are to be sold under the trademark Acronize.

Thus another development of real promise in the laboratory can now show what it can do commercially. In extensive field-trial work, Acronize has retarded major bacterial action with fresh-killed poultry so that acceptable "in store" freshness has been maintained easily from two to three weeks.

Considerable interest in the new process already has been indicated in the commercial field. So it is likely that practical experience will be accumulated quickly in different areas.

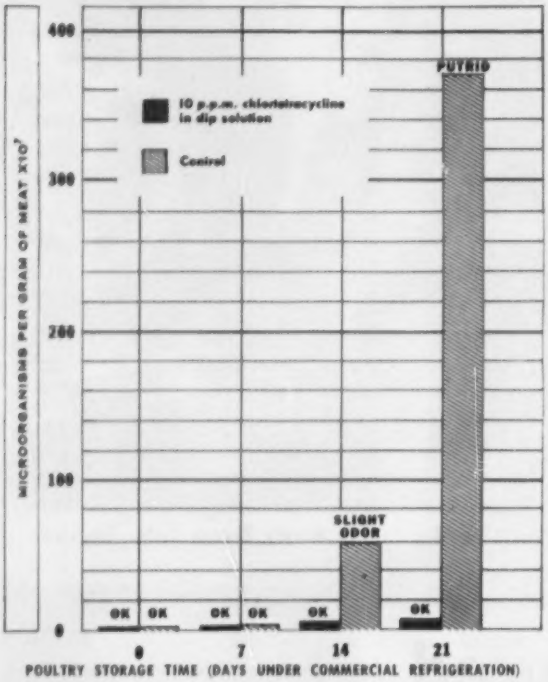
To insure that the product is used under the most favorable conditions, the technical field staff of the Fine Chemicals Division of American Cyanamid is working with processors who qualify on a performance basis.

Commercialization already is underway in different parts of the country, and many other processors are awaiting franchise approval by our technical field staff.

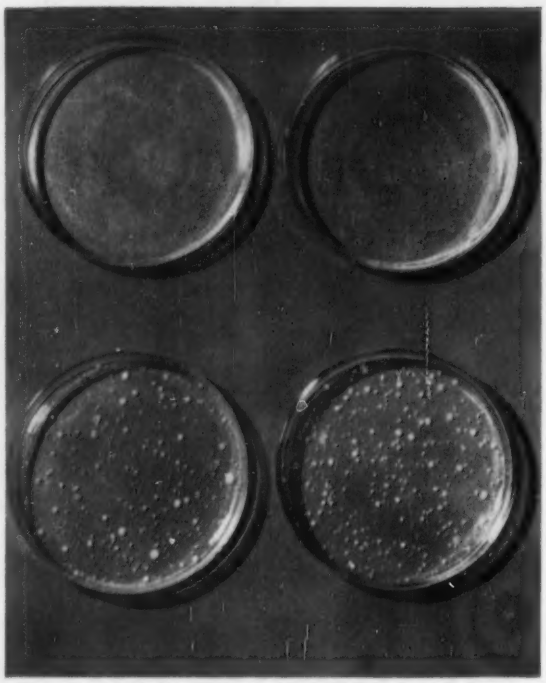
Aureomycin chlortetracycline was one of the first broad-spectrum antibiotics, so called because such compounds are effective against a wide variety of bacteria. Of unusual medical value, a whole new area of utility opened up for this antibiotic with the discovery that it could promote growth in chickens[2], pigs[3], cattle[4], and sheep[5]. Almost simultaneously, promise was indicated for food preservation.[6] And extensive work has been carried out in several laboratories over the past half dozen years.

Because of the need for appropriate U.S. Government action on an in-

Two-Way Proof That Antibiotic Does the Job



FRESHNESS of packaged poultry is maintained two to three times as long by Aureomycin chlortetracycline. Without antibiotic, odor develops after about 7 days.



BACTERIAL counts for two-week old poultry show 0.0234 million per gram of body weight for Acronized (top) and 756 million for control.

dividual commodity basis, poultry holds the principal commercial interest at present. However, a considerable number of field trials, as well as laboratory studies, have shown real promise for red meats and fish. Already, the government of Colombia has given permission for the use of Acronize in red meats. Other warm countries are showing official interest.

Still another area of interest, particularly in the U. S., is the possible use of Acronize in frozen foods to provide "built-in protection" against the consequences of unscheduled defrostings, etc.

Poultry Leads the Way

FDA clearance of Aureomycin chlortetracycline for poultry followed more than 10 years of research into the use of antibiotics, and related products, for the preservation of flesh foods. The results of such research were summarized as late as 1954 with the statement that "Chlortetracycline was found to be more effective in preserving such foods than any of 14 other antibiotics studied."[7]

The FDA action represented the final stage of clearance under Section 408 of the Federal Food, Drug & Cosmetic Act—which provides for the establishment of safe tolerances for residues of pesticides in or on raw agricultural commodities. This section, the so-called Miller Bill, was added to the Act in 1954. Under it, the Secretary of Agriculture must first issue a certificate of usefulness, a judgment of *utility*, before the Secretary of Health, Education & Welfare shall act on tolerances—or judge the *safety* of the application that is proposed.

Aureomycin chlortetracycline passed both criteria in regard to poultry, and the FDA statement said: "A tolerance of 7 parts per million is established for residues of chlortetracycline in or on uncooked poultry."[8]

In a covering press release from FDA explaining the action, it was stated[8] that "FDA's decision is based upon scientific evidence that cooking of poultry destroys this amount of chlortetracycline so that none is left when the meat is served."

How Used With Poultry

Extensive trials of Acronize disclose benefits possible to the poultry processor, distributor, and retailer. The method of use is simple. Acronize PD is the antibiotic product formulated for use with poultry. It is a yellow powder containing 10% chlortetracycline. A 2.6-oz. quantity of this is dissolved in about 2 gal. of water and poured into a 200-gal. tank of cooling slush for eviscerated birds. And during the routine cooling period, the poultry has been shown in unpublished studies in the American Cyanamid laboratories to take up enough of the antibiotic to inhibit originally the growth of as much as 99% of the total spoil-

TABLE I—PRESERVATION of poultry with Aureomycin chlortetracycline under commercial conditions.[10]

Type of Chicken	Length of 10 ppm. Aureomycin dip, hours	Aureomycin content of muscle γ/g.	Microorganisms × 10⁶/g. Days in cold storage (3 deg. C.) 7	14	21	28
Whole	0	....	0.135[5]	1390[5]	5400[5]	3500[5]
Eviscerated	2	1.3	0.004[4]	0.77[3]	10.7[3]	134[3]
	24	2.9	0.001[4]	1.85[3]	1.95[3]	10[3]
Cut-up	0	....	0.375[5]	787[4]	2845[5]	7150[5]
	2	1.1	0.002[3]	0.27[3]	14.0[4]	275[5]
	24	3.9	0.001[3]	0.012[3]	0.78[3]	23[3]

Legend: [5]=Putrid. [4]=Strong odor. [3]=Slight odor. [2]=Very slight odor. [1]=No odor or slime.

age microflora[9] count ordinarily present.

To avoid contamination, these birds were packaged as soon as they were removed from the cooling bath. When such poultry was stored under commercial conditions, it maintained freshness significantly longer than untreated birds and showed considerable contrast in bacterial population at 14 to 21 days.[10]

Here are some of the advantages of the use of Acronize: Practically no change is required in current procedures. The color, odor, and taste of fresh-killed poultry are maintained considerably longer. The increase in the period of accepted salability is significant—all the way along the line, from producer to consumer. And when the presently recommended concentration of 10 ppm. of Aureomycin chlortetracycline is in the bath, measurably less than the allowed tolerance of 7 ppm. is found in any part of the poultry.

Other than obvious freshness of the poultry, the consumer will not notice the presence of the antibiotic. The small amount applied to the raw bird in the cooling bath is destroyed in the cooking, whether the bird be broiled, boiled, roasted, or fried.

But assume that the birds were eaten raw, and that they uniformly contained as much as the allowed tolerance of 7 ppm. Then a person would have to eat each day 145 lb. of raw chicken meat before he could consume 0.5g. of Aureomycin chlortetracycline. This is the amount of antibiotic which has been given daily to geriatrics as a prophylactic dose for as long as four years—with only beneficial results.[11]

Under Franchise Arrangement

To maintain a high and uniform standard of quality for Acronized products—and to eliminate any possibility that Acronize might be used in place of sound and sanitary processing methods—American Cyanamid has chosen the franchise approach to commercial marketing. It involves a performance contract with a quality control section specifying the methods of use, of handling the processed poultry, and particularly the sanitary environment for processing.

Cyanamid takes the stand, incidentally, that the size of a processing operation is not necessarily a criterion of a good plant. There is no substitute for sound and sanitary methods.

Acronize cannot improve poor quality. It cannot make a bad bird good. It can make a good bird remain good longer. It can retard bacterial growth.

The sanitary standards demanded under the franchise are precisely those required by Federal authorities in Government-inspected plants.

Franchised producers are eligible to use the label devised for Acronized poultry by American Cyanamid. The company regards this as a badge of identification, which includes information desired by the regulatory agencies. We may hope that it will become a symbol of quality—of poultry uniformly processed to maintain freshness.

Benefits of Many Types

The advantages of this new technology can only come into clear focus after extensive commercial use. Birds, in common with fish and red-meat

Why Antibiotic Is Safe

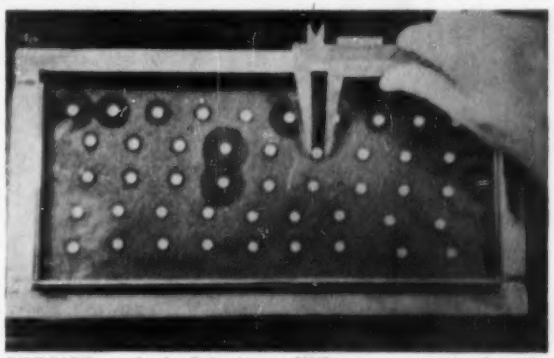
Safety is well established in the use of Acronize. Chlortetracycline, on which it is based, it unique as a candidate for an "additive" to human foods. A vast literature had already been developed under the trade-mark Aureomycin. This literature continues to increase simultaneously in human medicine and animal agriculture, where the levels of intake are much higher than those proposed for use in the raw foods discussed here.

Furthermore, American Cyanamid has emphasized applications of chlortetracycline for those foods where protection is desired up to the point of cooking. Because chlortetracycline is heat liable, cooking could be expected to destroy the antibiotic. This would negate the theoretical possibilities of sensitizing the consumer to the antibiotic —and the emergence of resistant strains of bacteria in the consumer of the food.[84]

It is well in any application, however, to consider a margin of safety. Reassurance is found in reports from medical literature in which daily intake by humans up to 1¼ oz. of chlortetracycline per 150 lb. body weight are recorded. Lower dosages, taken continuously over a period of years by humans varying from children[84] to geriatrics[85, 86, 87, 88] gave only beneficial results. Perhaps the champion all-time consumer of Aureomycin chlortetracycline was an older lady who took 8½ lb. of it during a 3½ year period.[89]

This indication of safety in humans is further fortified by years of animal work. Billions of swine and chickens have had chlortetracycline at a level of about 10 ppm. in their daily diet to speed growth by reducing subclinical types of disease.[90] And now a recent review by Lassiter,[91] a collaborator of American Cyanamid, points to new benefits from chlortetracycline in the raising of cattle and sheep.

But even with this record of the innocuousness of Aureomycin with humans and live animals, the FDA action on tolerances is based on the fact that there will be no active antibiotic in the food as eaten. To prepare for this, Cyanamid investigators have shown that extremely sensitive microbiological assay procedures will detect as little as one part of active chlortetracycline in 40 million parts of flesh.[92, 93] A great amount of unpublished data from our laboratories show that, under every conceivable method of cooking poultry, chlortetracycline becomes inactivated beyond detection.



PRECISE analysis detects as little as one part of antibiotic in 40 million parts of flesh. Here filter-paper disks containing fish tissue extract with traces of antibiotic produce dark circles where growth of organisms is inhibited on plate.

There is, therefore, virtually no possibility that any Aureomycin chlortetracyline will be consumed along with the cooked poultry. Of course, it follows that the antibiotic will, therefore, offer protection against spoilage organisms only up to the point of cooking. But this extends such benefits as maintaining freshness all the way into the consumers' kitchens.

What about fish and red meats? The major investigators[15, 89, 90] in these fields report that the antibiotics may be largely dissipated from the flesh of beef and fish either, or both, during storage and cooking.

PROTECTING fish by placing them in tanks containing antibiotic ice in shipboard experiments.

ANTIBIOTIC ice contains about 5 ppm. of Aureomycin chlortetracycline, has yellow color.

Keeps Fish Fresh Longer

For the application of Acronize to fish, investigators have experimented with ices, dips, and sprays containing Aureomycin chlortetracycline. Antibiotic ice was found to fit most generally with present-day operations aboard ship. And technologists[17] developed a formulation which would give a uniform dispersion of Aureomycin chlortetracycline in the ice cake.

The process is quite simple. It involves only the addition of about 4.5 g. of the formulated product (carrageen, calcium acetate, and Aureomycin chlortetracycline) to the freezing cans along with the water necessary to make a 300-lb. ice cake. This ice, containing 5 ppm. of the antibiotic, has been made on a trial basis in ice houses with a broad geographic distribution.

Benefits

Scrod haddock, caught and iced on boats sailing out of Boston, had a week longer at top quality than did fish caught at the same time and placed in ordinary ice.[18]

Halibut and salmon, taken in waters off the state of Washington, were iced as they were caught—some in ordinary ice and some in ice containing 5 ppm. of chlortetracycline. They were maintained in such ices during the trip to New York in refrigerated cars, as is the commercial custom. Upon arrival, the contrasts in color and odor were notable. The estimated extension of shelf-life of the fish packed in antibiotic ice was about one week.

Other varieties of sea food showed positive benefits from the applications of Acronize.

Research

The major part of the research into applicability of antibiotics to fish flesh preservation has been carried on by Dr. Hugh Tarr and associates at the Canadian Pacific Fisheries Experimental Station in Vancouver.

Dr. Tarr reported in Washington recently[16] that: "In our experience oxytetracycline is only one-fifth as active as chlortetracycline for flesh food preservation, and tetraycycline is less active than oxytetracycline."

Dr. Tarr[14] has reported nearly all spoilage organisms in fish to be sensitive to chlortetracycline. Also that the inclusion of only one to four parts in a million of refrigerated sea water or flake ice materially extends the freshness.

"We have found that the inclusion of these trace amounts of chlortetracycline will hinder bacterial development successfully for extensive periods—and that even after one month in refrigerated sea water containing this antibiotic, fish may still be quite edible."

Experimenters in California[19] have confirmed the effectiveness of chlortetracycline. Dr. Lionel Farber has stated that when fish fillets were dipped in two-parts per million solutions of various antibiotics prior to storing them at 45 deg. F., "chlortetracycline was most effective in prolonging the keeping quality."

TABLE II—PRESERVATION of halibut with Aureomycin chlortetracycline.[18]

Treatment Ice	Total microorganisms × 10^6 per gram				
	13 days	16 days	20 days	22 days	26 days
Regular	32.4 B	95.6 B	652.0 A	920.0 A	
CTC	0.12	0.15	3.0 D	69.2 C	108.0 A

Legend: A = putrid. B = strong odor. C = medium odor. D = slight odor.

TABLE III—PRESERVATION of salmon with Aureomycin chlortetracycline.

Treatment Ice	Total microorganisms × 10^6 per gram of fish				
	13 days	16 days	20 days	22 days	26 days
Regular	28.4 D	91.6 C	424.0 A	712.0 A	
CTC	0.59	0.74	4.8 D	40.8 C	73.2 B

Legend: A = putrid. B = strong. C = medium odor. D = slight odor.

animals, are biological specimens. As such they are subject to considerable individual variations in behavior patterns from birth, even through the storage period after death. Therefore, the larger the numbers involved, the more significant the average.

There is the further factor that in handling large numbers of any commodity, the care exercised with individual specimens is not likely to be the same as in small-scale trials. This is true even though one is operating under supervised quality control requirements.

Benefits are both technical and economic. The former can be better defined in the work to date. Some benefits cut across the board. Others are of principal importance in one phase of the business. Let's consider the various phases:

Processing—American Cyanamid Co. is engaged in a continuing program of technical cooperation with leading packers and processors to assess the value of Acronize in their own laboratories and plants. This program is being integrated within the distribution areas, all the way to consumer, to check on the maintenance of quality into the consumer's kitchen.

One indication of such cooperative

Protects Beef Carcasses

There are several ways of using the antibiotic in the preservation of red meat. For beef, a technique for the infusion of the entire carcass after death has been published by Deatherage and associates.[20] The solution of Aureomycin chlortetracycline, which should also be isotonic in salt, is pumped into the carcass through one carotid artery while the other is clamped off. About 3 g. of the antibiotic is used per 1,000 lb. live weight.

Dr. Deatherage also investigated[21] infusion of the live animal prior to slaughter. In cooperation with Cyanamid investigators, Ohio State workers carried out field trials in one of the warm-climate countries nearly a year ago, using both techniques.

In areas where there are extensive refrigeration facilities, such complete protection may not be necessary. But there remains the need, as in poultry, to protect primarily against the growth of spoilage organisms on the surface of the red meat. Here, a very quick dip or spray with the appropriate formulated product appears most useful.

Benefits

The experiments conducted in a warm-climate country by investigators from Ohio State University and American Cyanamid attest the practical value of Acronize for beef. Animals were dressed out and hung 72 hours in the shade of an open slaughterhouse before being refrigerated. Other animals, freshly killed and processed after death, were transported in the evening and during the night nearly 400 miles in a non-refrigerated truck. They were unloaded into the cold room less than 24 hours after they were killed.

The meat that was allowed to hang at room temperature for a couple of days was more tender than the meat which was immediately refrigerated. There was also indication of improved maintenance of color in the meat that had been processed with chlortetracycline.

The value of Acronize for beef preservation likely will vary with the development of the countries in which it is used, and with the location of meat-growing areas relative to the consuming areas. Some countries, now on a 24-hour basis for the handling of meats, may go on a 72-hour basis and perhaps even longer. Dr Deatherage of Ohio State reported[21] that rounds infused with Aureomycin had stood at room temperatures for as long as nine days without spoilage of the meat.

Research

The major part of the research on the use of antibiotics for the preservation of red meats has been done by Dr. F. E. Deatherage and his associates.

They early confirmed the findings of Dr. Hugh Tarr, and others, that Aureomycin chlortetracycline was the antibiotic of choice[7]. Studying the effectiveness of various antibiotics against 92 spoilage organisms from beef, they found that Aureomycin inhibited 81, a larger number than any other agent tested.[22]

Whole Animals Infused

After preliminary work with hamburger[23], the investigators[20] infused rounds with Aureomycin—and finally infused whole animals immediately after slaughter. When one side of such animals was refrigerated immediately and the other side was left 48 hours at room temperature, an improvement in tenderness and color was observed in cuts from the non-refrigerated side.

In these studies, 6,000 lb. of the beef was consumed by known persons without any adverse effect.

SPRAYING side of beef with Acronize solution immediately after slaughter to retard growth of spoilage bacteria in tests in Puerto Rico.

TABLE IV—PRESERVATION of ground beef with Aureomycin chlortetracycline.[23] (Average bacterial counts in millions per gram of ground beef)

Antibiotic	Days storage 10° C.	Concentration of antibiotic 2 ppm.	1.5 ppm.	1.0 ppm.	0.5 ppm.	Control 0.0 ppm.
Aureomycin.....	0	0.2	0.2	0.2	0.2	0.2
	3	0.3	0.3	0.5	0.5	100.0
	5	0.99	4.8	10.1	39.0	putrid
	7	5.0	10.0	30.0	75.0	putrid
	9	8.0	30.0	70.0	100.0	putrid

Putrefaction determined by odor and color.

studies to date is that Acronize will now make possible further shift of the packing and wrapping operations back through distribution channels to the processing plant. It appears that the concept of fresh poultry, packaged and untouched by human hands, from plant to consumer, now can be more readily attained.

And the shift to the mass production methods of the plants may effect real economies over cutting up and packaging in the individual store or supermarket.

Some indication of such economies was shown in a limited study carried out by our sales department. It was found that the cost of cutting up and packaging poultry in a large North Carolina supermarket, handling 1,500 birds a week, was about 3½ cents a bird. But in one of the large processing plants of Virginia, handling many thousands birds a day, the labor cost was calculated at ¼c. a bird.

Another possible Acronize benefit, which will need evaluation, is a considered change from the semi-scald method (immersion of the bird in water from 123 to 130 deg. F.) to the sub-scald method (138 to 140 F.).

More of the outer skin layer of the bird is removed in the latter method.

Ideas on Fresh Vegetables Fruits, Frozen Food

The effects of bacterial spoilage organisms are important in the preparation of some vegetables and fruits for freezing or for canning. Laboratory studies have indicated that, as with the spoilage bacteria for flesh foods, Aureomycin chlortetracycline performs with a high degree of effectiveness.

In the use of antibiotics for such applications, the present philosophy of the regulatory agencies must be kept in mind. This means that any antibiotic so used must be destroyed during canning, or by cooking in the case of frozen food. Thus in canning, one would not use antibiotics to permit less severe heat processing, with the thought that residual antibiotics would keep any viable bacteria from growing during the storage period after canning.

With frozen products, one would anticipate that antibiotic processing might provide extra freshness up to the point of freezing. And it might offer some insurance against unscheduled defrosting of frozen foods en route to the consumer.

Whale Meat Intriguing "Maybe" Application

And for just another quick look into the future, Acronize may solve a problem which has defied man since the days of Moby Dick.

"The whale presents an intriguing problem," Deatherage told the International Antibiotics Conference.[21] "He is a warm-blooded mammal so large that chilling rates are so slow that much potentially edible meat is lost before processing can be completed. . . . If antibiotics could be gotten into the carcass soon enough, then it is quite possible that spoilage could be materially reduced and the meat could be of great economic importance."

And reporting at the same International Antibiotics Symposium on current work in whales, Dr. Tarr[14] told of introducing an aqueous solution of Aureomycin chlortetracycline into the whale through air lines used for inflating the mammals prior to towing them. Another idea may be "to insert the antibiotic in, or at least near, the bomb head of the harpoons used."

It is too early, however, to judge the real promise of such work.

This has made the carcass more vulnerable to bacterial attack. The antibacterial action of Acronize may allow the process to be more seriously considered than it has in the past. The sub-scald method has been shown to give operating economies in picking and removing pin feathers.[12]

Transportation—Savings in shipping costs, extending the distribution range, and reducing the frequency of delivery are some of the expected benefits.

With Acronized poultry, cut up and packaged at the plant, it should be possible to load more into a refrigerated truck than when handling whole, unpackaged, iced birds. The magnitude of this economy can only be judged after extensive experience, including seasonal and climate variations.

The extra protection against spoilage may extend the distribution range to more distant markets. The costs here need to be equated with the costs of transportation, items such as feeds, and other regional factors.

With its longer period of dependable freshness in the store, Acronized poultry might permit a reduction in frequency of delivery to the store. One large delivery in contrast to two or three smaller ones—or a greater territory covered by a delivery truck—may provide more than transportation savings. It may cut the cost of such store operations as clerking, unloading, and bookkeeping.

Retailing—Acronized poultry can mean that the bugaboo of inventories—of too much or too little—becomes less for the retailer. He need no longer be concerned that the poultry remaining in the store Saturday night will be unsalable Monday morning.

The protection against the spoilage organisms that downgrade poultry should carry the retailer easily over the weekend, or until he receives his next delivery. This can mean, with proper buying and handling practices, that he can offer a product of dependable quality at all times. And he can keep an inventory on hand sufficient to meet the needs of almost any ordinary level of impulse buying. This likely would lead to increased consumption of poultry in the long run.

Consumer Benefits—The Acronize process can mean poultry with dependable freshness. If the trend to in-plant packaging is accelerated, the consumer can increasingly get a bird "untouched

(*Turn to page* 194)

Even More Useful Abroad

In many areas of the world where refrigeration does not exist, antibiotics alone may permit less waste in the distribution of perishables.

Field trials in warm climates—in Puerto Rico, Cuba, and Colombia—have proved that Acronize significantly extends the length of time that fresh-killed beef can be kept unrefrigerated.

IN PUERTO RICO few trucks or slaughter houses have refrigeration. Antibiotic protection is particularly valuable.

Producers of range cattle in Colombia and other South American countries look to the benefits of Acronize as a means of relieving their expensive spoilage problem in transporting beef from mountain areas to distant city markets. Previously, whole shipments of beef have spoiled after slaughter on remote ranges when the arrival of planes to deliver the meat to cities was delayed by a day or less.

Here is how Dr. Deatherage[21] summed up the value of chlortetracycline at the International Conference for Use of Antibiotics in Agriculture: "It means vast supplies of cheaper meat for people who do not live near areas where meat producing animals thrive. It means that live animals do not have to be taken to the point of consumption for slaughter . . .

"It means that if the highways are available, meat-producing animals can be killed 500 miles away from the point of consumption and trucked to market as carcasses. In some parts of the world it will make it economical to fly meat 1,500 miles or more to market."

NO HANDS NEEDED AS automated unloader disgorges cans from semi-trailer at MM plant. Conveyor-mounted sleeve moves out of body and dumps cans "jumble" fashion on belt that feeds unscrambler.

New Can-Handling System Reduces Labor, Boosts Output

Received jumble fashion, cans are unscrambled mechanically enroute to fillers at 1,100 per min. Method brings four big benefits to top-flight Florida citrus concentrator

B. M. MIDDLEBROOKS
Director of Concentrate Manufacture, Minute Maid Corp., Plymouth, Fla.

AUTOMATION is making welcome strides at Minute Maid Corp. plants in Florida—in the form of a new technique of can-handling that requires only one man's attention from the time empty cans are received until they enter the filling machines.

In addition to the large saving in labor, several other advantages have resulted which bid fair to be even more important. Among them are three—

1. Increased efficiency of filling operations made possible by the continuity of can supply.

With the variable flow of cans previously experienced, it was necessary to over-design filling and closing lines by approximately 25% in order to handle output of the evaporators. Now, with a uniform supply of cans, continuous filling at top speed is possible.

2. Reduction of approximately 15% in freezing capacity.

Previously it had been standard parctice to provide ample capacity for the peak of filling operations. Today, a smaller excess does it, thus enabling existing equipment to handle greater evaporator output and permitting new installations to be made at lower costs.

3. Less damage to cans and to the lithographing on them.

The system was developed jointly by Minute Maid and American Can Co. It employs semi-trailers equipped with false inner linings. The vehicles are loaded random fashion with approximately 135,000 cans (6-oz. size).

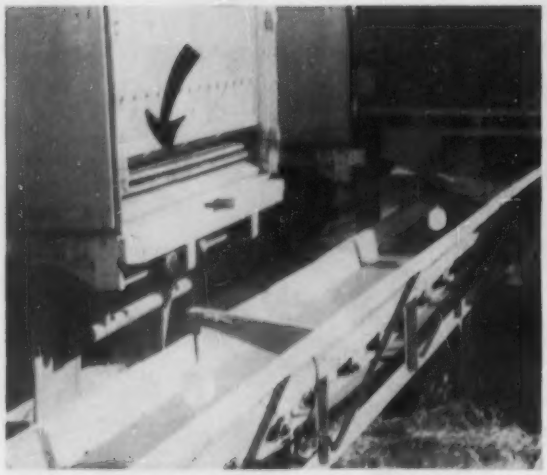
Upon arrival at a Minute Maid plant, the cans are automatically transferred to an unscrambler (Dudley Machinery Corp.) that supplies the filling machines. Capacities of the unscramblers ranges from 800-1,100 cans per min.

Trailer bodies are equipped with full-length-and-width motor-driven, reversible belt conveyors. Resting on these is an inner lining divided into compartments. This lining moves at the same rate of speed as the belt and permits the entire load of cans to be shifted with no motion on the part of individual ones.

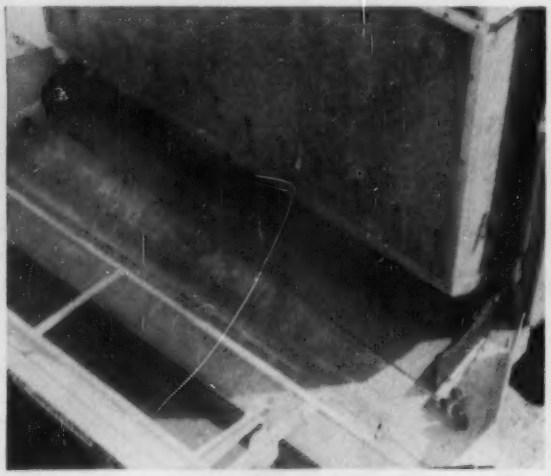
At the rear of the trailer, the cans drop from the compartments in a jumbled mass and fall onto a belt conveyor. This conveyor discharges to

Turn Page for 8-Picture Action Sequence →

Cans are automatically



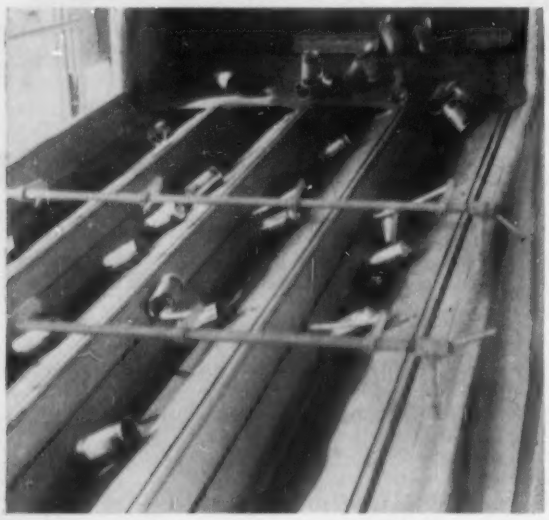
1 **TRAILERS** are backed up to belt for unloading. Note conveyor (arrow) on which inner sleeve rides.



2 **CONVEYOR** is started and sleeve moves out over belt. Float actuates microswitch that controls conveyor.

. . . then unscrambled

5 **HOPPER** holds 5,000 cans, has float (arrow) that controls feed. Here, cans are elevated and . . .



6 . . . **FALL** random fashion on unscrambler. Pins in sides of lanes align cans so they roll toward . . .

the supply hopper of the unscrambler, which aligns and indexes the cans, placing them on the conveyor that feeds containers to machines on the concentrate filling and closing line.

The entire system is interlocked so that cans are delivered automatically from the trailer to the closing machine as required. No manual starting of equipment and no manual handling of empty cans is required.

When Minute Maid began to pack orange concentrate in 1946, all cans were received in paper containers holding 575 cans. These were unloaded, stored, and finally transferred manually to gravity tracks that fed the filling machines.

Cans by the Carload

As filling line speeds increased, a switch was made to the conventional bulk car method—approximately 250,000 cans (6-oz.) loaded in a "pattern" in a rail car.

Cans were manually "forked" into chutes and rolled by gravity to cable-

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MULTIPLE ADVANTAGES: "I believe this innovation illustrates very well the multiple advantages from automation.

"First, it is self-supporting. Through direct cost reduction, it justifies the installation and returns dividends.

"Second, it demonstrates other savings which will finally overshadow the initial reason for the installation.

"And I believe that most efforts toward automation have this same two-fold effect."—B. M. Middlebrooks

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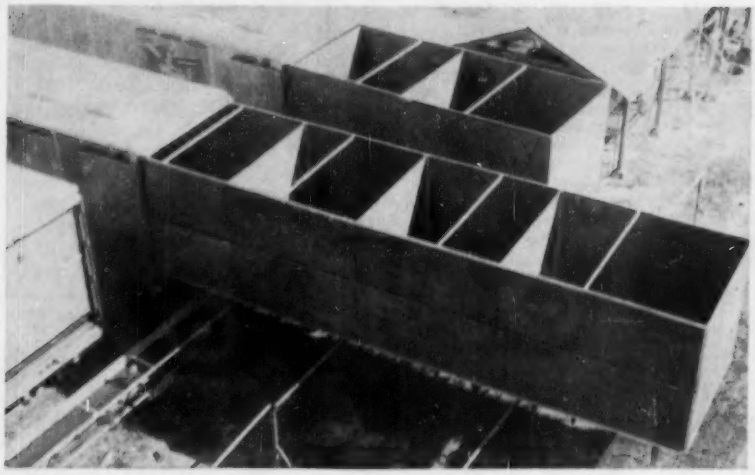
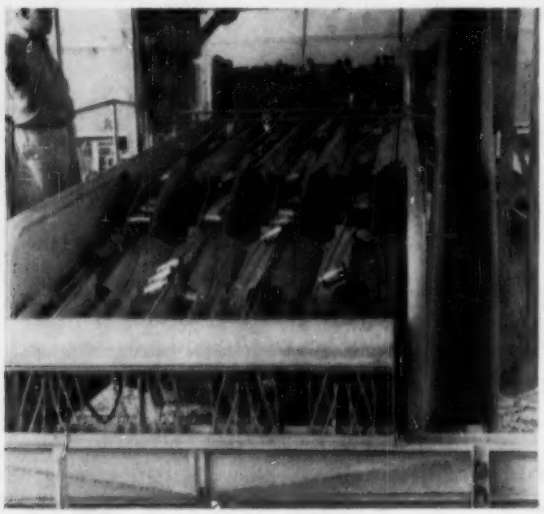
unloaded from trailers . . .



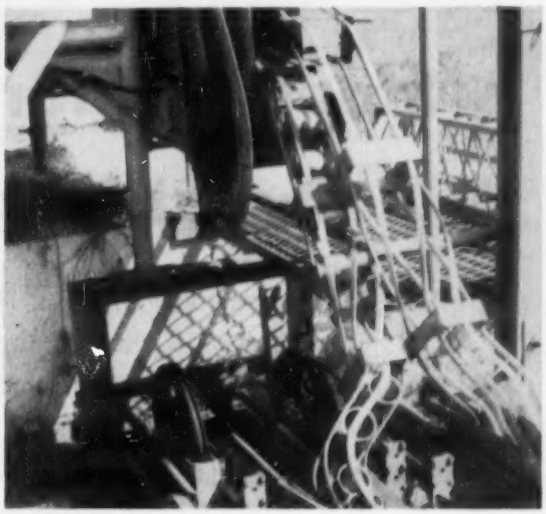
3 **OUTWARD** movement continues until all compartments are empty, then conveyor is reversed and sleeve retracts. Pipe stand supports sleeves.

4 **CANS** discharge from belt to elevator that feeds unscrambler.

and fed to the fillers



7 **. . . DIVIDER** where weight of bottoms separates them into lines with open ends facing.



8 **TWISTER** upends rolling cans and feeds them to cable track open end up.

powered tracks that delivered them to the filling machines. This method had its limitations, however, and various means were devised to speed removal of cans from the cars.

But each improvement had the same fault—it involved manual operations. An experienced operator could deliver a large number of cans at high speed for a short time, but he could not maintain a continuous supply for a full shift or period of operation.

Other handicaps were: (1) The time element involved in switching of cars, also in breaking down and setting-up within the cars; (2) interlocking of cans within the pattern stack; (3) moving of equipment in the car, and (4) training new personnel.

While searching for an improved method of can delivery, the Dudley unscrambler was introduced. But its use was confined to receipt of manually dumped containers into the machine's hopper.

Step-Wise Automation

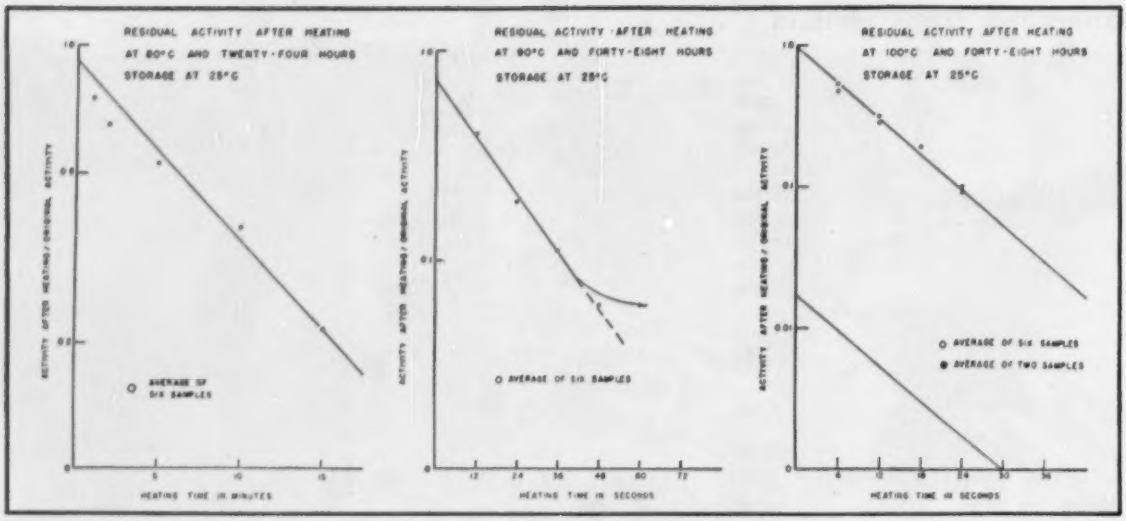
It did insure continuity of can supply, and it enabled use of untrained personnel. But it effected no labor saving, and it introduced a packaging cost not involved in bulk-car receipt.

At about this time, the American Can Co. began experimenting with transportation of cans in "jumble" fashion. Used were containers of various sizes, even full trailer loads. The latter seemed to offer an excellent solution to Minute Maid's problem and a system for receiving these cans in trailer loads was set up at our Leesburg plant.

The system has worked out so satisfactorily that it is being installed in the other company plants in Florida.

To receive a truck load of cans, the truck driver spots his trailer at the receiving hopper and the electrical connection is made between trailer

(*Turn to page 152*)


RESIDUAL ACTIVITY AFTER HEATING AT 80°C AND TWENTY-FOUR HOURS STORAGE AT 25°C
RESIDUAL ACTIVITY AFTER HEATING AT 90°C AND FORTY-EIGHT HOURS STORAGE AT 25°C
RESIDUAL ACTIVITY AFTER HEATING AT 100°C AND FORTY-EIGHT HOURS STORAGE AT 25°C
ACTIVITY AFTER HEATING / ORIGINAL ACTIVITY
HEATING TIME IN MINUTES
HEATING TIME IN SECONDS
O AVERAGE OF SIX SAMPLES
● AVERAGE OF TWO SAMPLES

Heat-Inactivation Curves Tell the Story

Sharp drop in residual peroxidase activity is seen in all cases as heat-inactivation time and temperature increase. By assuming a first-order reaction, curves may be extrapolated to any activity level to spot the required process time at various heat-inactivation temperatures below 100 C.

Stopping Storage Off-Flavors By Curbing Peroxidase

New findings pinpoint optimum HTST process for preventing enzyme's regeneration — thus eliminating this type of canned-food spoilage . . . Value seen against other enzymes and bacteria

D. F. FARKAS, S. A. GOLDBLITH, and B. E. PROCTOR

Department of Food Technology, Massachusetts Institute of Technology, Cambridge

How off-flavors develop in storage of HTST-processed foods rich in peroxidase has now been clarified by new enzyme-inactivation data.

These findings loom as particularly important to the canner—because he likely is undercalculating his process time by not having a proper accounting of the heat resistance of this enzyme above 255 F.

And since this can lead to regeneration of active enzyme after high-short sterilization, off-flavors may result in stored foods.

To check this possibility, we launched a study of the kinetics of peroxidase inactivation at temperatures used in normal and HTST procedures, also targeting enzyme regeneration and thermal limits required to prevent it.

Working with peroxidase from crushed fresh peas, we found the following:

1. Between 100 and 150 C., the heat-inactivation curve for peroxidase indicates an F_z* of 6 and a "z" value of 48 F. Normal process for canned foods uses a "z" of 18-20 F., hence the importance of heat resistance of this enzyme above 255 F.**

2. Regeneration of peroxidase becomes a factor only when required heat-inactivation time is greater than that provided by normal processing, e.g. above 255 F.

3. Other enzymes may also have destruction curves that are flatter than generally supposed. This could have some bearing on the increased heat resistance shown by bacteria during HTST processing of various foods.

For example, our data indicate that an F_z of 100 at 284 F. is necessary for complete destruction of peroxidase. Fortunately, this represents only 1 min. of heating at 284 F., but is very much out of proportion to the process required for bacterial destruction.

Test Procedure

Our peroxidase source—stock pea filtrate—was dispensed in 3-ml. test tubes and stored at 0 F. until needed. Six 0.03-ml. samples were simultaneously heat-inactivated at various times and temperatures, then stored up to one month for assay of residual activity.

The large number of samples required a rapid assay method. Thus, we chose an optical test using a Lume-

* Time in minutes at 250 F. required to inactivate the enzyme

** Slope of the logarithmic heat-inactivation curve

tron colorimeter with a 420-mμ. filter and a micro guaiacol-H_2O_2 assay technique.

Capillaries containing enzyme suspension were placed in a heating bath for varying times at different temperatures, then automatically cooled and assayed.

Optical density at 420 mμ. of the peroxidase-guaiacol and hydrogen peroxide reactants was read at 10-sec. intervals. Resultant plot of optical density (x 10) gave a straight line over the first 100 sec.

Relative activities of various samples were compared by reading the slope of the line at 50 sec., where:

Units of activity = (Optical Density at 50 sec.)/50

Unheated preparations showed an activity of 0.110-0.120 units, while the method permitted sensitivity of 1 part per 1,000 of original activity.

We determined the inactivation curve for peroxidase by two procedures. First consisted of heating samples for periods of time necessary to show inactivation or trace activity after one month of storage, while the second used rate-of-destruction techniques.

Samples for regeneration studies were heated and stored for 0, 24, and 48 hr., and 5 days, then assayed for residual activity.

Inactivation Above 100C.

Data obtained from samples stored up to one month at room temperature (21-25 C.) were divided into three groups, depending on whether sample showed activity, trace activity, or complete inactivation (negative assay test). In all cases, no activity was obtained immediately after heating.

Heated samples having a slope of 0.010 activity units or greater were considered active, based on 0.120 as an average value for unheated preparations. Trace activity was assigned to samples between 0.004 and 0.010 units.

Fig. 1 represents experimental

(*Turn to page* 152)

They *Aren't* All Destroyed

"It is generally assumed that enzymes in fresh foods are destroyed during normal canning.

But recently, several reports[1, 2] point to off-flavors caused by active enzymes (peroxidase) in canned goods after storage. Acid products[3, 4, 5] and HTST-processed foods are thus affected.

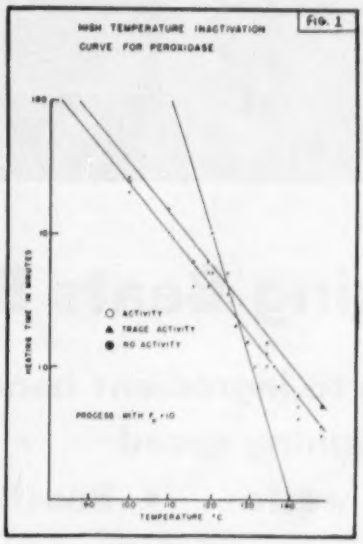
"Closely associated with this problem, especially at blanching temperatures, is that of enzyme regeneration on storage. Although this has been a factor in freezing and drying of foods,[6, 7] it is only with HTST that the problem appeared in the canning field.

"There has been much research on enzyme regeneration at below 100 C.,[8] but relatively little above that point.

Thus our study of kinetics of peroxidase inactivation at high temperature, and of enzyme regeneration during storage.

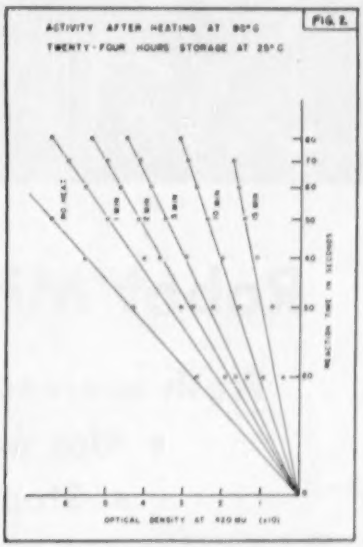
"For this work we found the heat-inactivation method of Stern and Proctor[9] particularly useful."—D. F. F.

1. Guyer, R. B., and Holmquist, J. W., "Enzyme Regeneration in High-Temperature Short-Time Sterilized Canned Foods," *Food Technology* 8, 547, 1954.
2. Kapian, A. M., Esselen, W. B. and Fellers, C. R., "Enzyme Systems of Canned Acid Foods," *Ind. & Eng. Chem.* 41, (9) 2,017, 1949.
3. Anderson, E. E., "Pasteurized Fresh Whole Pickles—I. Pasteurization Studies," *Food Technology* 5, 279, 1951.
4. Nebeskey *et al.*, "Thermal Destruction and Stability of Peroxidase in Acid Foods," *Food Research* 15, 114, 1950.
5. Labbee, M. D., and Esselen, W. B., "Effect of Peroxidase Concentration, Acidity, and Storage Temperatures on the Development of Off-Flavors in Fresh Packed Pickles," *Food Technology* 8, 50, 1954.
6. Joslyn, M. A., "Enzyme Activity—Index of Quality in Frozen Vegetables," *Food Ind.* 18, (8) 1204, 1946.
7. Balls, A. K., "Control of Enzymatic Action in Foods," *Proc. Inst. Food Tech.*, 165, 1943.
8. Schwimmer, S., "Regeneration of Heat-Inactivated Peroxidase," *J. Biol. Chem.* 154, 487, 1944.
9. Stern, J. A., and Proctor, B. E., "A Micro-Method and Apparatus for the Multiple Determination of Rates of Destruction of Bacteria and Bacterial Spores Subjected to Heat," *Food Technology* 8, 139, 1954.



HTST Data

ABOVE 100 C., points showing trace activity lie between two parallel lines having a "z" of 48 F. and an F_0 of 4-6 min.



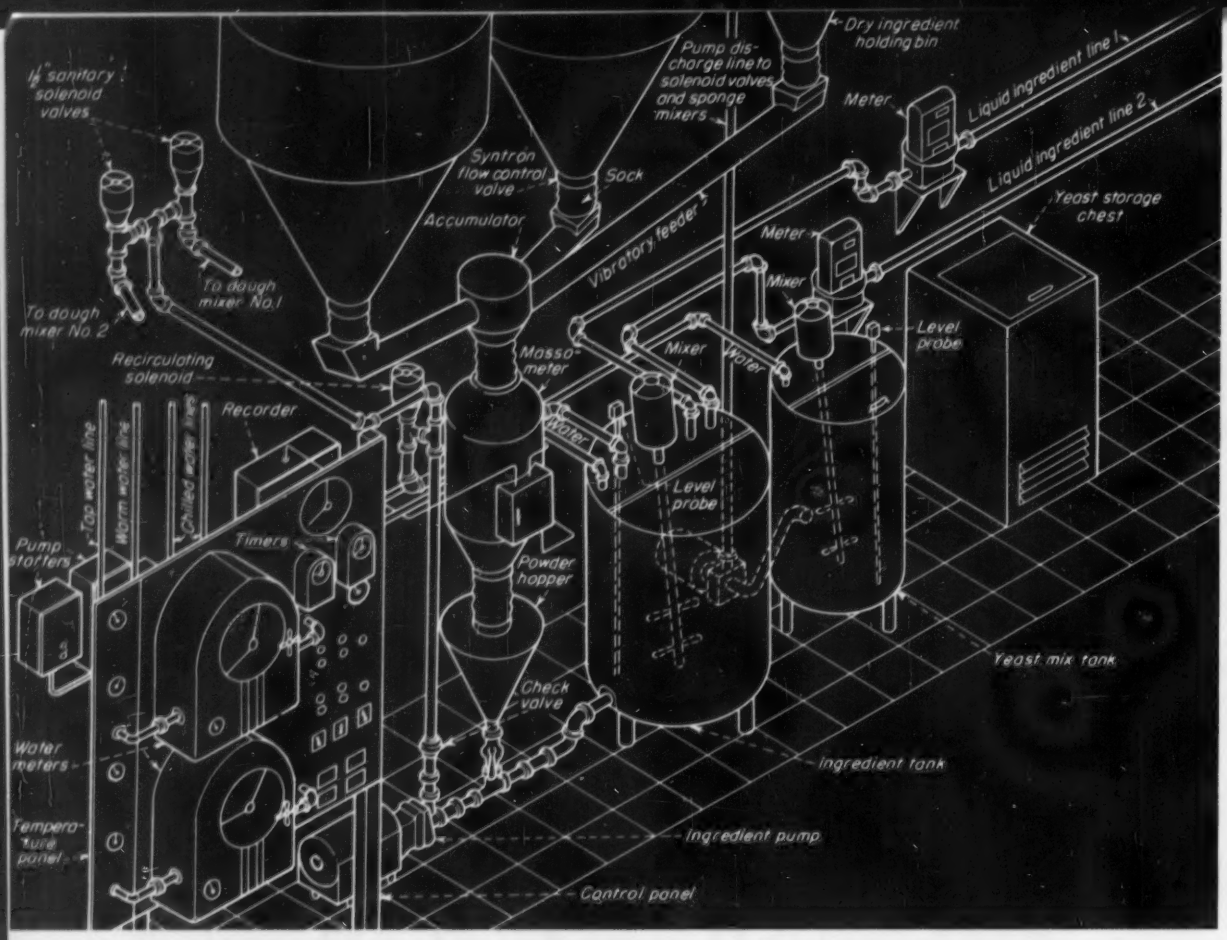
Assay Technique

RAPID ASSAY of enzyme activity is by micro guaiacol-H_2O_2 technique. Optical density of reactants is read at 420mμ.

HOW PEROXIDASE ACTIVITY Varies With Heat Treatment, Storage Time

Temperature (deg. C.)	Heating Time (Min.)	Slope (Activity Units) 0 Hr.	24 Hr.	48 Hr.	7 Days
80	10	0.0646	0.0740	0.0738	0.0636
	15	0.0602	0.0566	0.0636	0.0550
	20	0.0300	0.0344	0.0380	0.0256
	30	0.0180	0.0194	0.0206	0.0200
					5 Days
90	0.1	0.0500	0.1130	0.1030	0.1150
	0.2	0.0200	0.0730	0.0860	0.0390
	0.4	0.0004	0.0340	0.0436	0.0300
	0.8	0.0002	0.0104	0.0104	0.0150
100	0.1	0.0100	0.0660	0.0660	.....
	0.2	0.0058	0.0394	0.0394	.....
	0.4	0.0000	0.0120	0.0120	.....
105	0.1	.....*	0.0568	0.0568	.....
	0.2		0.0376	0.0376	.....
	0.4		0.0146	0.0146	.....
	0.6		0.0070	0.0070	.....
110	0.1	.....	0.0540	0.0776	.....
	0.2	.....	0.0260	0.0260	.....
	0.4	.....	0.0108	0.0204	.....
120	0.1	.....	0.0320	0.0506	0.0550
	0.2	.....	0.0122	0.0200	0.0240
	0.4	.....	0.0001	0.0106	.....
	0.6	.....	0.0036	0.0106	0.0150
	0.8	.....	0.0028	0.0100	0.0140
130	0.1	.....	0.0296	0.0296	0.0330
	0.2	.....	0.0124	0.0124	0.0158
	0.4	.....	0.0080	0.0080	0.0126
	0.6	.....	0.0070	0.0070	0.0126
	0.8	.....	0.0070	0.0070	0.0084

* Indicates no measurable activity.



Robot Mixing Beats Bottlenecks

Fresh approach to ingredient handling problem—

• Ups weighing speed • Cuts costs

• Stops waste • Boosts quality

LEONARD F. PATRIDGE
Consulting Engineer, Tuckahoe, N. Y.

A prime requirement of any automatic system is that it eliminate costly manual labor—yet maintain human flexibility.

It is this latter point that has heretofore defied the baker's attempts to put dough and sponge ingredient mixing under continuous instrument control. For, of all baking operations, this requires the greatest number of batching and measuring steps.

Hot water, chilled water, tap water, dry and liquid ingredients, and yeast—all must be metered in careful amounts and blended with split-second accuracy to meet formula demand.

Now, a new handling and mixing system (Lenpat) has been devised.* It employs timing sequence controls and solenoid and thermostatic valves to do the job better and faster. By eliminating batch cans and open weigh hoppers, this robot method sharpens scaling accuracy and cuts waste to a negligible figure.

Further, sanitation gets a boost. Dust conditions and likely infestation points are done away with by this system. It combines easily-cleaned air conveying lines for moving dry ingredients and pump-supplied lines for liquids and the finished mix. Screw conveyors, bucket elevators, and mixer platforms are not employed.

*Patent applied for.

A single panel controls ingredient blending for both sponge and dough mix. It has a manifold for close temperature regulation of blending water.

A yeast tank, homogenizer tank, massometer, pumps, and various ingredient bins comprise the rest of the equipment. Despite its apparent mass (see isometric drawing) the compact system occupies much less space than is commonly taken up by sprawling ingredient pallets and standard conveying lines. And one man only is needed to set controls and supervise batching steps.

If desired, an additional panel can be added, equipped with dough-mixer controls and consistency recorders—*thereby putting the entire dough mak-*

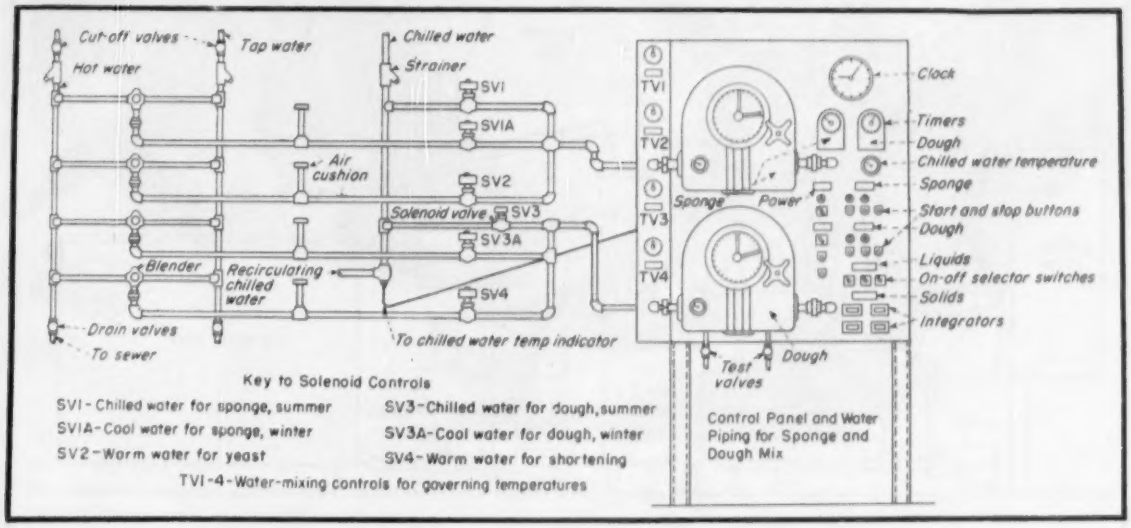
ENCLOSED, SANITARY, FAST-ACTING SYSTEM BLUEPRINTED

← OVERALL VIEW

PRE-SET CONTROLS on gage board regulate metering of liquid ingredients and massometer-weighing of drys. A pump recirculates solution while solids are being added. Timer-controlled cycle ends when solenoid valve opens and pump shoots solution to dough mixers.

DETAILS OF CONTROLS ↓

PIPING DIAGRAM shows flexible means of adding water. Relays on panel actuate solenoid valves that feed chilled, tap, and hot water to mixer as needed during different mixing stages. A level probe, located in mixing tank, shuts off water flow at proper level.



ing process under a single man's thumb!

However, it should be noted that in large bakeries a second man is needed to place troughs, dump mixers, and transport troughs to and from fermentation rooms.

But now, a quick rundown on how dough and sponge mix works:

Pushbutton Speed

Dough ingredient mixing is completely automatic, even to weighing and gaging dry and liquid materials. Furthermore, entire process takes only 7½ min. from start to finish. All operator need do is adjust controls.

To start action, supervisor sets mixing valve at about 90 F. for shortening water, and a second valve at 40 F. for chilled water. He adjusts water meter for total required poundage. And he turns weighing integrators to correct measure for each dry ingredient. Circuit switches are closed for each required liquid additive.

Finally, the timer is set to give necessary mixing period. Operator then presses start button. This act energizes a series of relays and produces the following chain reaction:

A solenoid valve in the water manifold opens and allows warm water to flow through meter to mixing tank. Valve is closed by mix tank probe when fluid reaches proper level.

Then a solenoid in the recirculating line opens, and a pump circulates water through line and back to mixing tank. At this point, shortening pump starts, sending hot fat to tank through a meter. The latter cuts off at preset amount. Shortening line is equipped with electric heating cables and there is recirculation to prevent chilling.

Next, a single liquid ingredient pump moves all wet additives to tank at the same time. This reduces time needed for this step. Separate meters are used for each ingredient, of course, because of variable densities.

When all liquids have been added, chilled water flows into tank until stopped by top-level probe.

How Drys are Weighed

Next come dry ingredients. These flow in turn from storage bins over vibratory feeders to a massometer, where each is accurately weighed. They fall by gravity to a power feeder, and are injected into circulating solution on suction side of slurry pump.

Actually, three methods have been developed for weighing. First, the massometer is most efficient for every case except where small amounts of ingredients are to be measured. It comprises a spinning impeller that continuously measures and discharges the flow of ingredients.

A second system involves use of batch weigh hoppers. It reduces system to semi-automatic operation, since hopper must be dumped manually after weighing is completed.

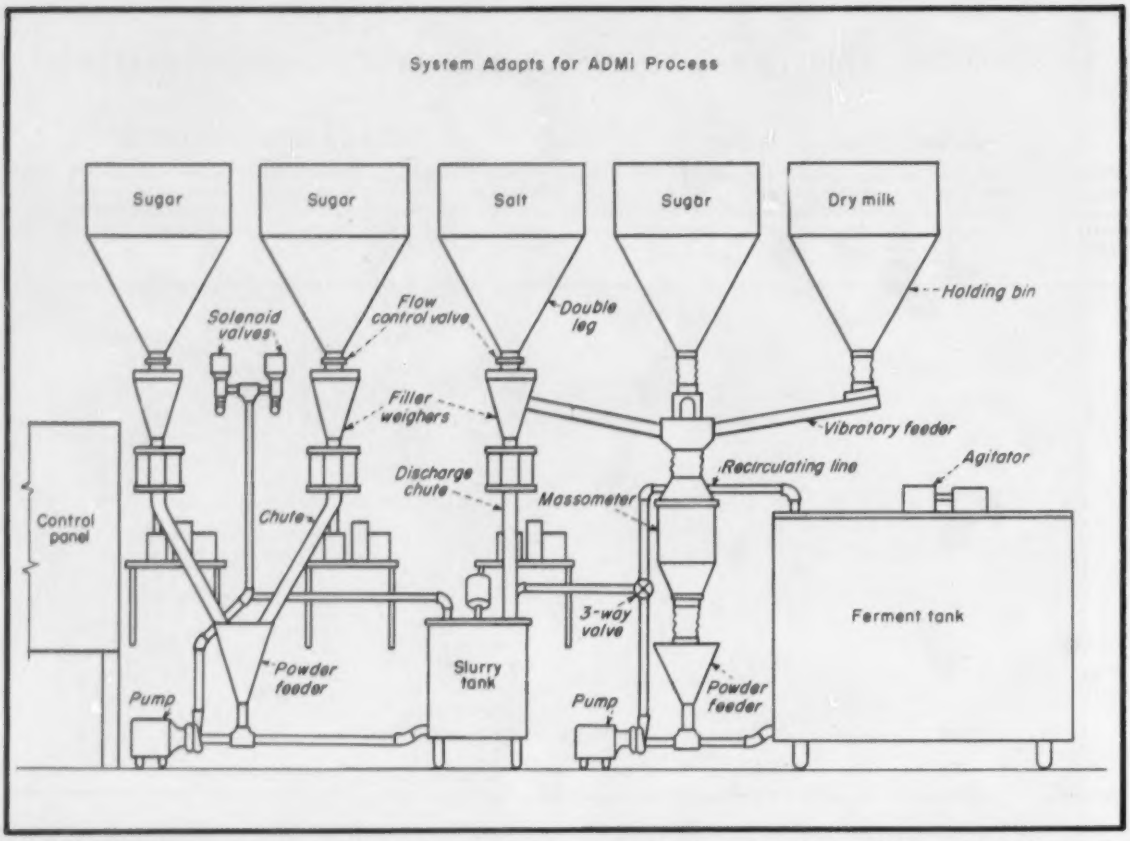
The third technique—volumetric—is of particular advantage in measuring small quantities of various dry materials.

Continuing on the dough-mix, when correct weight is reached on each ingredient, bin feeder shuts off and starts vibrator on next bin.

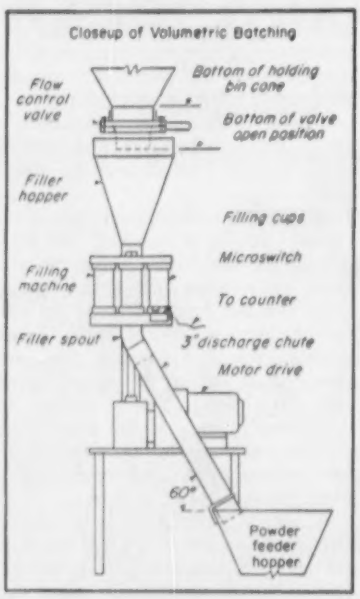
As the last feeder finishes its job, circuit closes and slurry begins timed mixing cycle. Following this, discharge line to dough mixers opens and slurry pump shoots mixture to dough machines. At the same time, another solenoid in the water manifold springs open, and sends chilled water through meter to tank.

A special relay locks out mixing tank probe so hot water will not flow into tank if solution level drops before metered amount of water has been added. Thus, chilled water flushes out entire system, and even washes off mixer agitator.

When pump loses suction, operator presses stop button. This closes all



STABLE FERMENT process is handled by this flexible system. Larger ingredient tank holds additional liquid. Massometer still weighs bulk ingredients. But volumetric fillers accurately measure small ingredient amounts unique to ADMI system. Added hoppers feed the split weighing-mixing setup.



FILLER-WEIGHER DETAILS show method of metering small quantities of dry ingredients. Microswitch actuates counter. Motor is stopped by a brake when the pre-set weight is reached on gage board totalizer.

solenoids, shuts off red operation light, and resets timer for the next cycle.

Complete Flexibility

Equipment for mixing sponge ingredients is provided for those bakers using the process. It is a semi-automatic operation, in that supervisor must add dry ingredients by hand. However, water controls, mixing, cycle, and solenoids are triggered by timer just as in the dough process.

Here, all operator need do is set timer to desired yeast-mix time, adjust water meter for needed poundage, and press starter.

Warm water flows into mixing tank until stopped by probe. And supervisor adds broken yeast cake and dry ingredients through hatch in mixing tank. Agitator and timer start simultaneously. When cycle is through, robot control opens and mixture passes to sponge mixers. Fresh water flushes out system. Total elapsed time — about 3 min.!

Handles ADMI Mix, Too

With only small changes, this flexible set-up can be used for the stable ferment process developed by American Dry Milk Institute.

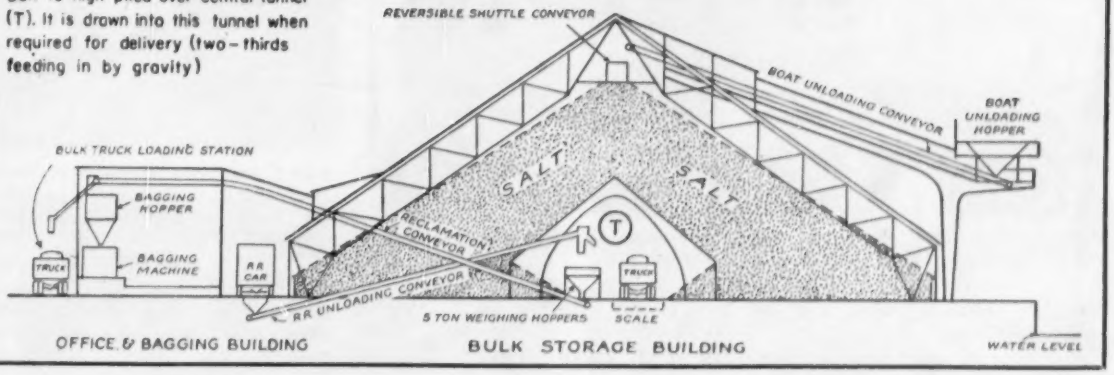
A slightly larger ingredient tank is needed, because of ferment volume. Shortening solution is prepared in the regular way, and liquid and dry ingredients are introduced. Then after all ingredients are in solution and mixer has started, ferment is pumped in from its own tank. At this time yeast is broken up and added.

If processor uses powdered yeast, it may be fed automatically just like other ingredients. Total mixing time is about 2 min., which is long enough for thorough stirring of materials, but insufficient for yeast to act on sugar.

To handle the small quantities of dry materials used in this type mix, a unique weighing system has been evolved. It comprises a series of filling machines (Spee-Dee), equipped with microswitches, that batch ingredients (see drawing left).

Each time a cup revolves and discharges its load into hopper, microswitch signals a totalizing counter (which registers in pounds). Filler-weighers are driven by brake-equipped motors that stop instantly when total weight has been measured.

Salt is high-piled over central tunnel (T). It is drawn into this tunnel when required for delivery (two-thirds feeding in by gravity)



Unique Warehouse

Its Special Design Strikingly Combines —

• Big Capacity • Fast Handling • Flexibility • Worker Safety

The new million-dollar Chicago warehouse of International Salt Co.—designed to store many types and sizes of salt—embodies features and equipment that are pioneering in their concept.

Specifically, the men behind its layout gave these four objectives top priority:

Important Objectives

1. To provide large storage capacity within a relatively small area. 2. To permit rapid withdrawals of product from any of the storage areas. 3. To set up storage facilities for keeping ten sizes and types of salt separate and free from contamination. 4. To furnish a maximum of safety for personnel in a structure which would have a

Huge Receiving Facilities "Engineered In"

FROM 5,000-ton self-unloading boat, salt is picked up by 150-ft. boom-conveyor at 1,000 tons per hour. It is poured into 16-ton-capacity hopper, from which it is fed into warehouse by inclined conveyor (foreground).

PUSHBUTTON-OPERATED reversible conveyor takes salt from inclined belt for direct feeding into ten specially built storage bins.

HERE, salt on 3,300-ton river barge (foreground) is transferred by 3,000-lb.-capacity clam-shell bucket into outrigged hopper for delivery into warehouse by conveyor.

favorable insurance rating and low maintenance cost.

Design of the huge new salt depot revolves around the special handling and storage characteristics of bulk rock and evaporated salt. The rock type is received from the company's Michigan mine (under the City of Detroit) and from its Louisiana mine (on historic Avery Island). Evaporated salt is shipped in from the firm's refineries at Watkins Glen and Ludlowville, N. Y.

The 21,150-ton capacity of the main bulk-storage building reflects the great demand for salt in this area. Warehouse property includes enough space outside for open storage of approximately 50,000 additional tons of salt.

Among the primary uses for salt in this region are meat packing, canning, pickle packing, nut roasting, general food processing, water softening, and ice control.

Salt may be received at the warehouse from self-unloading lake freighters, general cargo ships, river barges, any type of standard railroad freight equipment—or, if necessary, from transport trucks. And it may be speedily shipped by rail and truck.

Construction of Warehouse

The sharply sloping (32 deg.) outer roof of the warehouse matches the angle of repose of the average salt pile. Perhaps the most unique feature of the building, however, is the 36-ft.-wide tunnel that runs directly through the center of the building under the salt piles. The latter are contained in ten bulk bins—one holding about 13,000 tons and the others about 1,000 tons of salt each.

The central tunnel can take automatic gravity-delivery of two-thirds of the entire bulk salt stored in the bins. Tunnel is protected by a heavy wooden roof, sloping at 40 deg. and composed of 2x10-in. timbers mounted on edge and starting at a point 9 ft. above floor level. Support is achieved with a series of large reinforced concrete arches. Structure actually does not look like a salt warehouse, but rather like the inside of a cathedral with a massive arched roof.

Other unique features of the bulk storage building: Large roof is supported by a number of two-hinged Delta framed trusses constructed of Douglas fir. Trusses have a clear span of 149 ft. between the hinge pins and a height of 70 ft. at the peak.

Triangular end walls of building are thick retaining components made of reinforced concrete. Salt piles up against them to a height of almost 60 ft. Another concrete retaining wall divides the building approximately in half.

One half of the bin area contains rock salt. The other half is divided into nine bins for storage of various sizes of rock and evaporated salt. Partitions for bins are of open cribbed wood construction, the cribbed walls being held in place between the flanges of steel "H" sections.

Floor of warehouse is laid on a

salt-stabilized fill, a type of construction that amply supports anticipated loads. Salt-soil stabilization is a technique for treating natural soils which is rapidly gaining popularity for road purposes because of its economy and the ability of the finished surface to stand up under all types of weather and traffic abuse.

Roads around the outside of the warehouse have been salt-stabilized, and further treated with a thin coat of oil and spread with crushed stone.

Bulk storage building is 178x162x 70 ft. (from ground to peak) and 16 ft. at the eaves. It is constructed principally of timber and reinforced concrete.

How Salt Is Handled

Arriving water-borne cargoes of salt enter the warehouse through a loading hopper located opposite the center bay of the building on dock side. Salt from hopper is uniformly fed onto a 48-in. high-capacity (1,250 tons per hr.) inclined belt conveyor for delivery to a 48-in. reversible belt shuttle conveyor that traverses the length of the building 52 ft. above warehouse floor.

Loading hopper and inclined belt conveyor are carried on a steel cantilevered rigid-frame structure. Here, the upper end is supported on the lower chords of roof trusses and lower end on a steel column set 22 ft. from the dock line. Hopper is at the edge of the dock, and is supported on the cantilevered portion of the structure.

Road clearance under the structure is 28 ft., and the top of the hopper is 40 ft. above the road. By this arrangement, movement of ship or barge is minimized, since unloading operations can be carried out by use of mobile cranes located on either side of hopper.

A spiral stair connects loading hopper deck and bottom end of conveyor deck with the ground. And a 3-ft.-wide stairway has been provided on each side of the conveyor for servicing and as an entrance to the top portion of the building.

No housing has been provided for the hopper proper, but the conveyor is protected by a half-round corrugated galvanized steel cover.

Head end of the inclined conveyor discharges into a bifurcated chute, so arranged that salt flows in the direction in which the shuttle conveyor is traveling, thereby eliminating possible pile-up caused by the right-angle change in the flow.

The shuttle conveyor is a wheel-mounted, winch-powered steel frame (about 84 ft. long) that carries a 48-in.-troughed, reversible belt conveyor. One end discharges into a bifurcated chute for delivery to either side of the longitudinal partitions that separate the nine bins in the grade-size section of the building.

The other end discharges, directly off the conveyor, into the 96-ft.-long coarse salt-size section. By shuttling this conveyor, level topped piles are obtained throughout the entire length of the warehouse.

An ample walkway on each side of the conveyor track running the entire length of the building has been provided for inspection and servicing routines. An escape ladder to the ground has been located at each end of the walk. All conveyor and traversing controls are in the center bay at the head end of the inclined conveyor.

Rail shipments are received in a hopper located below a spur track. Salt from this hopper flows onto a 24-in.-wide inclined belt conveyor at 150 tons per hour.

Conveyor is arranged to discharge either into warehouse trucks or into one of the two 5-ton suspended scale hoppers for transfer to the reclamation conveyor.

Salt may be received from trucks by dumping into the track hopper.

Activation of the huge new salt depot is a specific step in International's expansion of its sales territory into the Midwest. This facility will serve Chicago proper, plus a four-county area—Cook, Lake, and DuPage Counties in Illinois, also Lake County in adjacent Indiana.

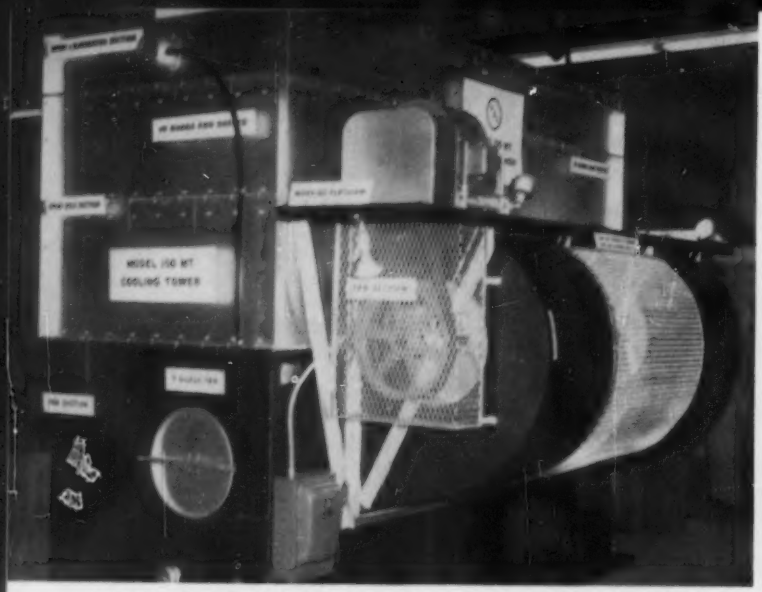
From Storage Bin to Delivery

FRONT LOADER scoops 3,000-lb. load of salt at single "bite" from one of the ten bulk-storage bins and . . .

. . . DROPS IT directly into one of the 5-ton scale hoppers that serve the local delivery units.

FE Lens

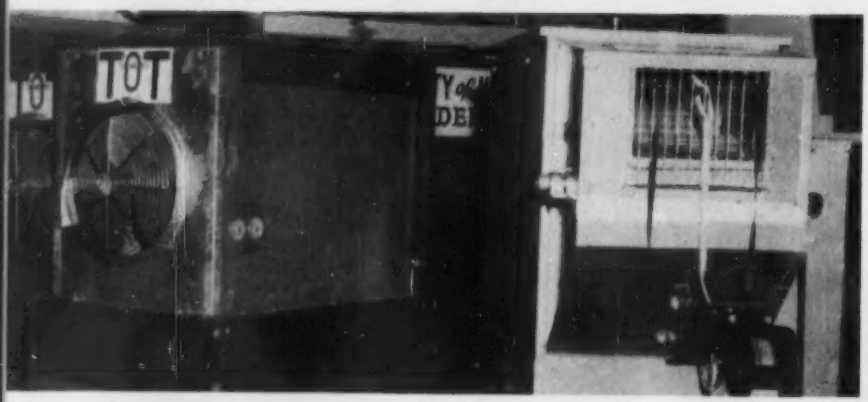
Cost Cutting



ALL-STEEL COOLING TOWER, made sectional for ease of assembly and maintenance, operates quietly, occupies small area. Line includes 22 sizes with capacities up to 350 ton.—Baltimore Aircoil Co., Baltimore. (60A)

REDWOOD FILLING is used for wet-deck surface of this easily-cleaned stainless-steel tower. Six models (2-27.4 tons) cool 95-F. inlet water a full 10 deg.—Morris Sheet Metal Works, Columbus Ohio. (60B)

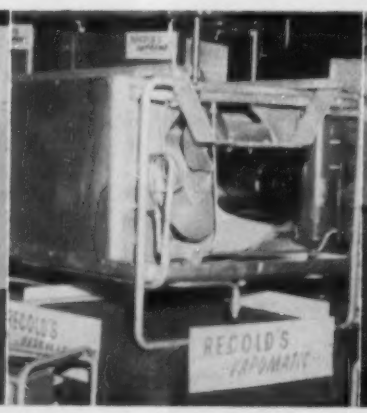
3 EFFICIENT COOLING TOWERS



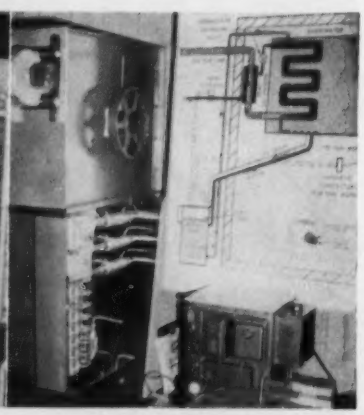
INDUCED-DRAFT towers of wood and metal are structurally designed for hard, continuous duty. Steel unit (right), made of hot-dipped galvanized sheets, has rubberized undercoating on all inside surfaces. Ratings: 2-125 tons.—Tet Towers Inc., Houston, Tex. (60C)

3 DEFROSTERS AND 4 PACKAGED CHILLERS

ELECTRIC HEATERS automatically defrost low-temp cooler. Air-bypass door speeds de-icing.—Refrigeration Appliances Inc., Chicago. (60D)



VAPOR SYSTEM uses fluid's heat of compression for fast defrosting at low temperatures.—Refrigeration Engineering, Inc., Los Angeles. (60E)



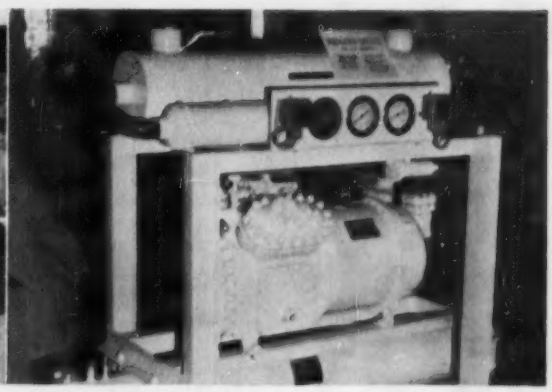
HEATED GLYCOL, circulated within inner tube of product cooler, defrosts coils from the inside.—Bush Mfg. Co., W. Hartford, Conn. (60F)

Spots Refrigeration Advances

Equipment for Food Processors Seen at Atlantic City Show

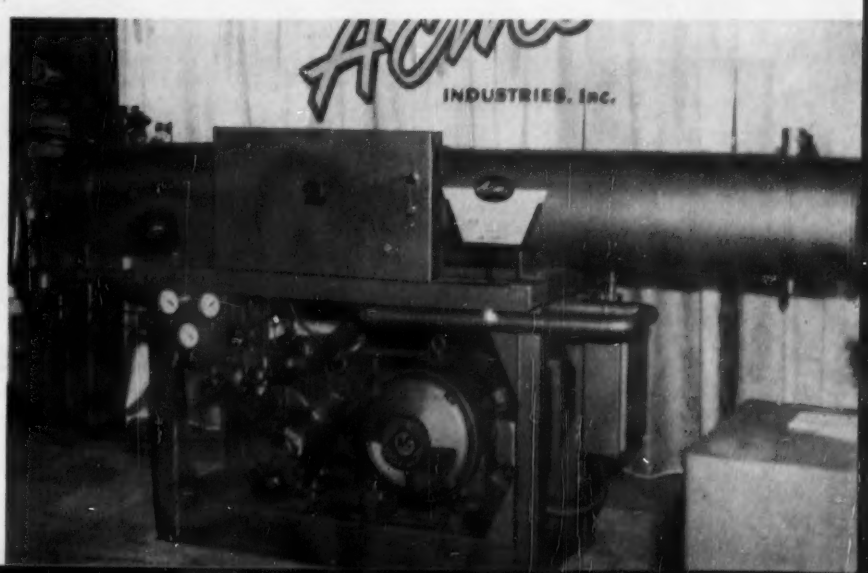
BULK-MILK COOLING TANK has stainless-steel lining and cover for easy sanitation and product protection. Precise agitation and efficient insulation of built-in refrigerated surface provide rapid cooling. Sizes: 200-1,000 gal.—The Creamery Package Mfg. Co., Chicago. (61A)

PACKAGED WATER CHILLER is a 25-ton absorption-type refrigeration unit. Versatile machine uses either process or waste steam.—Servel, Inc., Evansville, Ind. (61B)



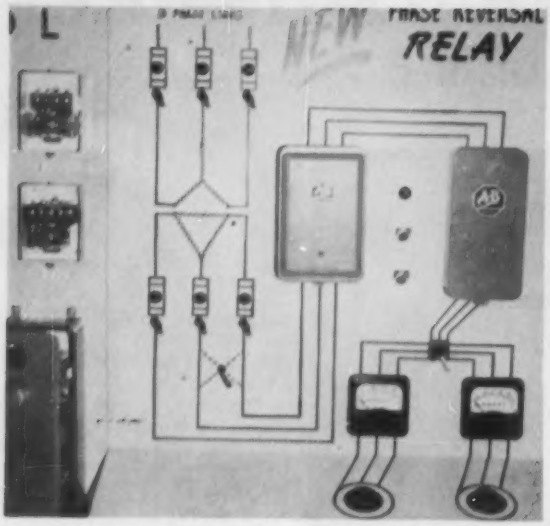
EASILY-INSTALLED chiller incorporates a dual-voltage motor. Unit is available in ratings from 25 to 125 tons. —Worthington Corp., Harrison, N. J. (61C)

COMPACT machine combines motor, compressor, chiller, condenser, heat exchanger, and necessary controls for economical installation and space saving. Pre-piped and tested refrigeration circuits lower maintenance. Ten models offer cooling capacity from 20 to 150 tons.—Acme Industries, Inc., Jackson, Mich. (61D)

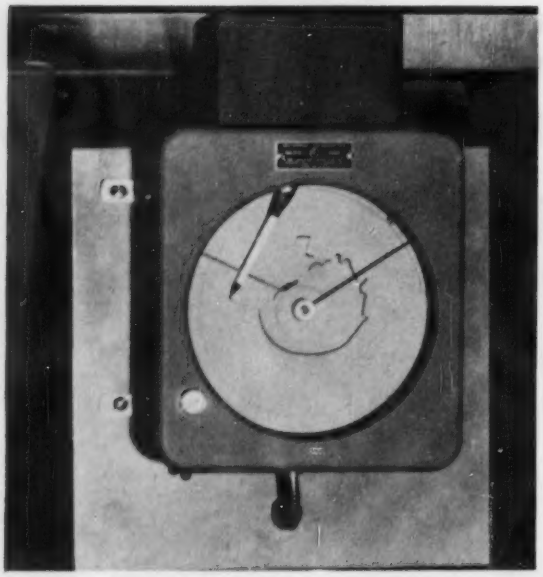


Turn Page for More Units

RELAY, RECORDER



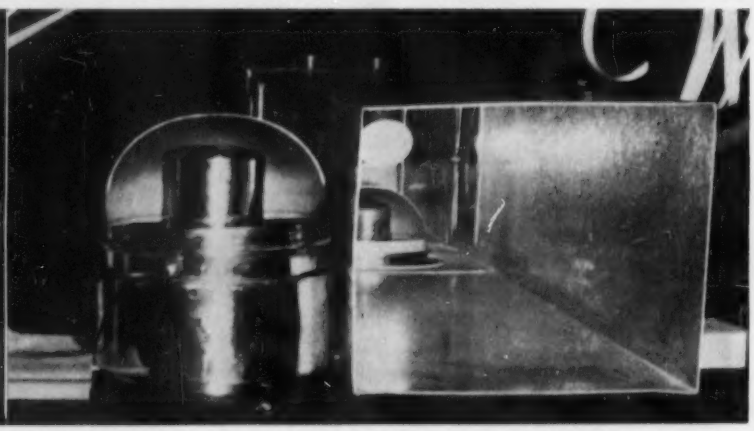
NEW RELAY protects 3-phase motors against phase failure and reversal.—Allen-Bradley Co., Milwaukee. (62A)



BATTERY-POWERED recorder does not use ink; burns impression on chart.—Electric Auto-Lite Co., Toledo. (62B)

HUMIDIFYING AND DEHUMIDIFYING UNITS

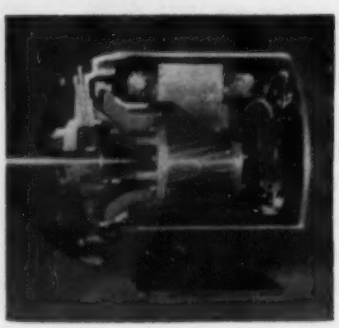
AUTOMATIC air-dryer cycles between dual, silica-gel towers to regenerate.—Dryomatic Corp., Alexandria, Va. (62C)



COMPACT humidifier installs in ducts and employs centrifugal action to disperse water droplets. Unit contains only one rotating assembly—Walton Laboratories, Inc., Irvington, N. J. (62D)

BLOWER AND MOTOR LINE

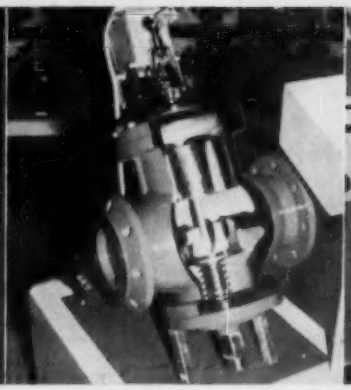
ROTATING STATOR is built-in to the blower wheel to cut inlet obstructions, thus up air output. Five models, 500-1,500 cfm. in both 9 and 10 in. wheels.—Lau Blower Co., Dayton. (62E)



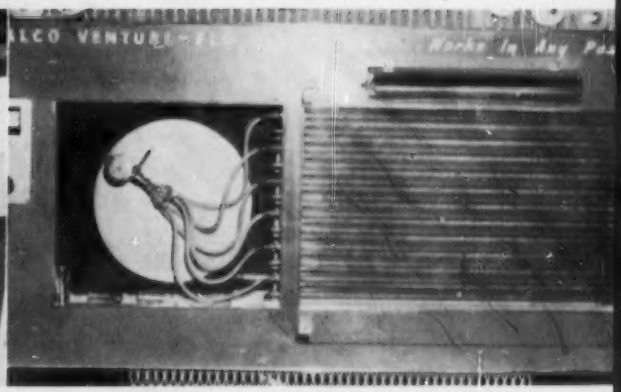
RE-RATED MOTORS meet NEMA's specifications for 48-frame design. Available in fractional ratings below ⅓ hp.—Century Electric Co., St. Louis. (62F)

3 NEW VALVE LINES

WATER CONTROL regulates cooling flow to condensers. Adjusts from 60 to 260 psi.—Marsh Instrument Co., Skokie, Ill. (63A)



BACK-PRESSURE REGULATOR is now available in ¾ to 6 in. sizes from 2 to 700 ton capacity.—Refrigerating Specialties Co., Chicago. (63B)

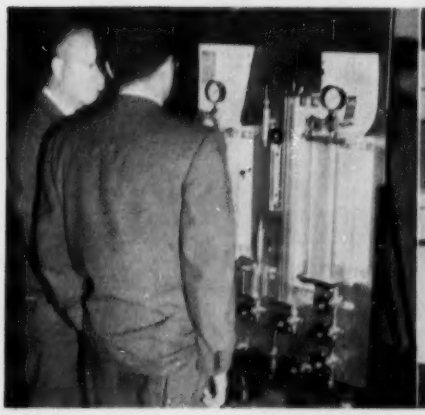


VENTURI DISTRIBUTOR divides refrigerant evenly among evaporator circuits with a minimum of pressure loss. It may be mounted in any position without affecting operation. For use on any direct-expansion evaporator.—Alco Valve Co., St. Louis. (63C)

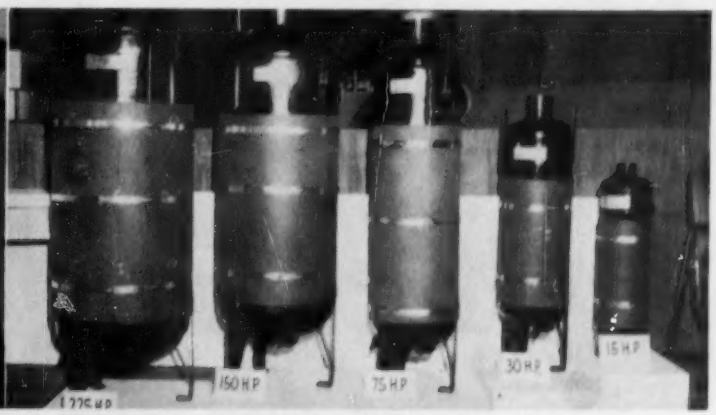
PREFAB PANELS, TEST CART, AND PURIFIERS

ACCURATE ASSEMBLY of line of prefabricated wood or galvanized steel freezers is given by special screwed fittings.—Marby Co., Minneapolis. (63D)

SANDWICH-TYPE panel construction features foam core with glass fiber, aluminum, stainless, or plywood facings. Mastic compound joins panels to form efficient refrigeration rooms.—Haskelite Mfg. Corp., Grand Rapids. (63E)



PORTABLE refrigerating service station allows easy measuring and testing of Freon 12 and 22 systems.—Airserco Mfg. Co., Pittsburgh. (63F)



FLOAT-TYPE SEPARATORS remove oil from refrigerant and return it to compressor sump.—Temprite Products Corp., Birmingham, Mich. (63G)

Circle Key Numbers on Readers' Service Card

↓ 2 Basic Syrups . . . 3 Practical Chocolate Milk Formulas ↓

	I	II
Cocoa (10–12%)	12.5 lb.	12.5 lb.
Sugar	50.0	48.0
Corn or invert syrup	....	8.0
Water	37.5	31.5
Stabilizer	5–10 oz.	
Vanillin	¼–⅓ oz.	
Salt	3–6 oz.	

Other flavors such as cinnamon, nutmeg, almond, and malt may be added if desired.

TABLE I

	I	II	III
Cocoa	1.25 lb.	1.25 lb.	1.50 lb.
Sugar	5.50	6.00	5.90
Spray dried whole milk	.....	6.75	.....
Malted milk	.....	.....	5.25
Stabilizer	0.06	0.06	0.06
Water	.....	85.94	.....
Fluid milk (defatted or regular)	93.19	.....	87.29

All formulas add up to 100 lb.

TABLE II

Technical Tips On How to Use Chocolate Products *in Milk*

Expert points way for dairy, beverage men to formulate, sterilize, and flavor. Stresses safeguards for preventing fat separation and sedimentation

FIRST OF TWO SPECIAL ARTICLES*

FRANCIS X. KOBE
Technical Director, Rockwood & Co., Brooklyn, N. Y.

Not only have dairymen accented their interest in the "extra outlet" of chocolate milk drinks–but now other processors, too.

For modern dried milk powders, including malted milk, permit easy production of these popular beverages by various manufacturers–particularly makers of soft drinks.

But a number of problems of formulation, flavoring, fat separation, and sedimentation still arise to plague both dairyman and bottler. And here we will spotlight these quality-destroying factors and point up the remedies.

Chocolate milk beverages are generally of two types: Those made with fluid whole milk, and those containing more or less defatted or skim milk.

Butterfat is probably the most variable constituent of this product, except for flavorings. In some cases, skim milk is used–in others whole milk. Most processors use a combination of the two.

A 2% butterfat is usually recommended. Higher fat contents make a richer product, but also increase cost. While the particular market for the product may play a part in deciding this issue, much depends on legal standards and statutory labelling requirements.

This is especially true where distinctions are drawn between "chocolate milk" and a "chocolate drink", or where malt extract or malt syrup is used in lieu of malted milk powder.

In finally establishing a formula, processors should carefully consider these seven factors:

1. **Flavoring and color of chocolate.**
2. **Acidity and flavor of milk base.**
3. **Solubility and flavor of dried milk powders.**
4. **Sweetness of product.**
5. **Viscosity and sedimentation.**
6. **Fat separation.**
7. **Sterilization and sanitation.**

With regard to the first factor, chocolate flavoring may be added in the form of a chocolate syrup or as a dry ingredient in a mix. In either case, it is advisable that it be introduced at the pasteurizer prior to pasteurization.

Flavor—Liquid or Dry?

Many varieties of chocolate syrups can be made or purchased, though some should be classified as cocoa syrups, since they contain little or no chocolate liquor.

Formulas for two typical basic syrups are shown in Table I. These should be mixed at the rate of 1 gal. to 10-11 gal. of milk.

A cooking temperature of 185-190 F. for 10-20 min. is normal practice in syrup manufacture. This extracts a great amount of water-soluble flavor and color from the cocoa powder and results in a more fully developed flavor in the final product.

However, some processors prefer to use cocoa in its powder form, either alone or in a mix. This results in freight and container economy, and offers wider latitude in flavor.

There are two types of cocoa, namely: "Natural", sometimes called American or domestic process; and "alkalized", more commonly known as Dutch process.

Although blends of the two kinds are made, the latter is frequently preferred. It is prepared by treating cacao nibs or liquor with small quantities of food-grade alkaline materials such as potassium or sodium carbonate. Treatment improves solubility of the cocoa, reduces acidity, and imparts a stronger flavor and richer color.

However, use of dark, alkalized

* Watch for concluding article, "Technical Tips on How to Use Chocolate Products *in Ice Cream*," in a forthcoming issue.

cocoas, designed particularly for the baking industry, should be avoided.

The amount of cocoa material in chocolate milk ranges from 1.0 to 1.5%, as seen in three typical formulas for this product (Table II).

With regard to malted milk, it appears that many processors do not fully understand the meaning of the term.

Actually, it is a food product made by combining fluid whole milk with liquid separated from a mash of wheat flour and ground barley malt. This mixture is dried to a powder.

By definition, such a malt product should contain not less than 7½% milk fat and not more than 3½% moisture.

While mixtures of malt extracts and milk powders can be used to simulate malted milk, there is a fundamental difference between the two forms.

What Affects Product Hue?

Color of chocolate milk varies widely. But grey and purple hues are considered objectionable. Red and brown tints are desirable shades. Color intensity is decreased by higher fat contents and use of homogenized milk.

Appearance will also be affected by uniformity of color dispersion, stratification of particles, sedimentation, and presence of a cream layer.

For the best product, quality of fluid whole or skim milks used should be no lower than that of regular milk for home consumption. And here, acidity merits particular attention. It should be limited to 0.2% (on a fluid basis) to preserve product stability. Increased acidity may bring about a "wheying off" effect or separation in the chocolate milk—thereby detracting from its appearance.

These same precautions must be exercised when dried milk powders are used. Further, spray dried milk is preferable to that made by roller process, because of its greater solubility.

But this alone will not guarantee that all particles will be dissolved, in fact, it is not uncommon to find undissolved particles in bottle tops. These are sometimes caused by passing chocolate milk over a cooler previously used for cream or on which some frozen milk adheres.*

Excessive processing temperatures, improper agitation, and poorly cleaned equipment can all produce this same trouble. Homogenization will help disperse particles to some extent, and use of fine strainers may be helpful.

Degree of sweetness in a chocolate milk is another variable. Consumer tests indicate a preference for a sugar content 5-8%—with the lower value being more common.

How to Decrease Settling

Sedimentation can be a great problem. It is due to several factors, perhaps being more prevalent where dry mixes are used in preference to syrups.

This settling-out is caused by improper process temperatures, accelerated rates of heat transfer, and faulty instrumentation. It also may stem from temperature differences in the bottle, slow cooling, low viscosity, and lack of uniformity in cocoa particle size.

Four factors—aging, mechanical vibration of the product during shipment, undissolved particles of milk solids, and increased acidity—speed rate of sedimentation.

Cocoa, like other vegetable products, contains a variable amount of fiber which does not dissolve in milk or water. Thus, unless preventive measures are taken, this matter will sooner or later separate from the suspension, and be either trapped in the cream layer or settle to the bottom.

Four things can be done to correct this defect:

1. Eliminate insoluble particles by settling-out methods or centrifuging.

2. Increase fineness or degree of grind.

3. Raise product viscosity.

4. Solubilize the cocoa.

Centrifuging or settling-out methods are not always practical. Nor are methods for solubilizing cocoa with enzymes. Size reduction and increased viscosity are more practical.

Fine Particles Are an Aid

Grinding cocoa extremely fine will prove helpful, since rate of settling varies inversely as the square of the particle size.

Even so, continued standing may cause these fine bits to settle out. And because of their relatively large surface area, even a small amount can give the impression of being a large quantity of solids in the bottom of the container.

In this regard, water (especially when it's hot) causes a swelling action in cocoa matter, tending to increase its apparent volume.

Homogenization of syrups and the finished beverage solely for reduction of particle size has not been particularly successful. In fact, homogenizing fluid milk under high pressures has been known to increase sediment, because proteins are destabilized.

Thus, the factor of particle size, alone, does not solve problem of sediment.

The other practical possibility of producing a non-settling beverage is use of thickening agents.

These include the gums, such as India, locust bean, karaya, guar, and Arabic—and such products as cellulose, Irish moss, sodium alginate or other algin and carragheenin-based stabilizers, pectins, dextrins, and special starches.

It is desirable to use a stabilizer which is not only effective in holding cocoa particles in suspension, but which also keeps finished product viscosity reasonably low.

Here, consumer taste preference may be the deciding factor. Excessive thickness has been found undesirable because it gives a filmy after-taste in the cold beverage. Also, it increases the possibility of scorching the product while it is hot and perhaps improperly agitated.

Manufacturers' processing instructions for stabilizers should be followed implicitly.

High viscosities entrap air, too, and thus present the problem of not only removing this air, but of possibly creating slack fills.

Stopping Fat Separation

A cream layer may occur in the product. Produced by fat separation, it retains enough cocoa particles to make it darker than the rest of the milk. This layer becomes increasingly visible on aging and uneven in color and mottled in appearance.

In dairy plants, product creaming is inhibited by pasteurizing milk at 160-165 F. for 15-30 min. Addition of suspending agents to prevent sedi-

(Turn to page 140)

Chocolate Drinks Zoom

Americans drank about 200,000,000 gal. of chocolate beverages during 1955—an 11.5% increase over the '54 figure of 180,000,000 gal., states the Chocolate Milk Research Foundation.

And this figure set a new high in retail dollar volume of $175,000,000. Outlook for '56 indicates further sales increase, say Foundation officials.

Credit for the increase goes to these four factors:

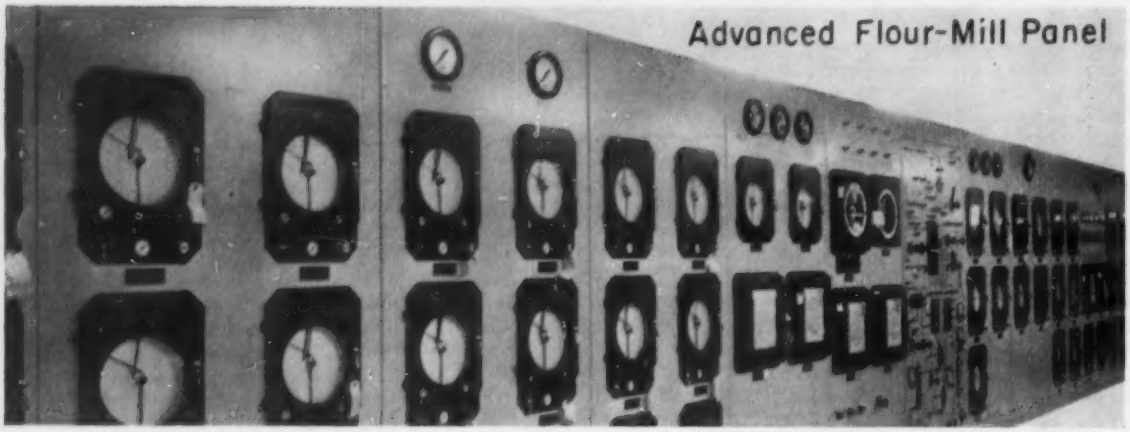
1. An increased awareness by processors and consumers of the nutritional values of the chocolate product.

2. Wide-spread promotion by the Foundation.

3. Better understanding by school dieticians of the value of this beverage in helping children meet their daily milk requirements.

4. New uses for the drinks, such as serving them hot and using them for cooking ingredients.

* Weckel, K. G., "Chocolate Milk," *Milk Plant Monthly*, 24, Mar. 1946.



"Automatic Miller"

Given this setup, you'd have the "last word" in instrumented mills. In the author's words: ". . . Just push the master button—and you're in operation. Scan the machine floors with closed-circuit TV to insure smooth startup. Then, after minor adjustments and visual checks, you have your *Automatic Miller*."

These Process Controls Automate Flour-Milling

Instruments that regulate weighing, grinding pressure, speed, and particle size make this line automatic from time wheat hits first break until flour goes to storage . . . Units and flowline detailed

H. D. VANDERLIP

Application Engineer, Allis-Chalmers Manufacturing Co., Milwaukee

With our population surging up to unprecedented levels, the productivity of the "flour mill of the future" is fast becoming a necessity today.

Fortunately, through process instrumentation, the tools for greater output per man-hour are available. These are automatic controls that apply to the milling flowline from the time wheat hits first break until flour goes to storage.

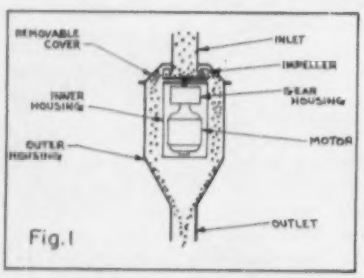
Naturally, there will be skeptics in this field which has relied so heavily on the skilled artisan. But in the light of today's economics, let the practical miller weigh the following compelling advantages of automatic control:

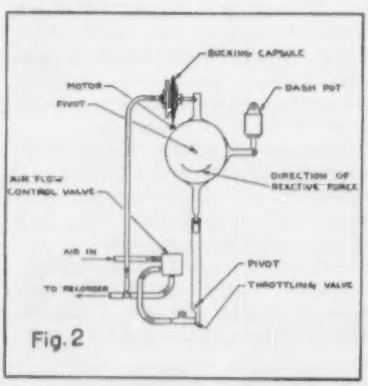
1. *Lower production costs* through reduced direct-labor charges, and savings in power and maintenance.
2. *Improved quality control* to meet product specifications, which today are becoming increasingly rigid.
3. *Optimum yield* by avoiding frailties of human judgment.
4. *Better employee relations* in which there is recognition of industry's obligation to maintain good working conditions.

And as tools of process instrumentation we have four control principles—

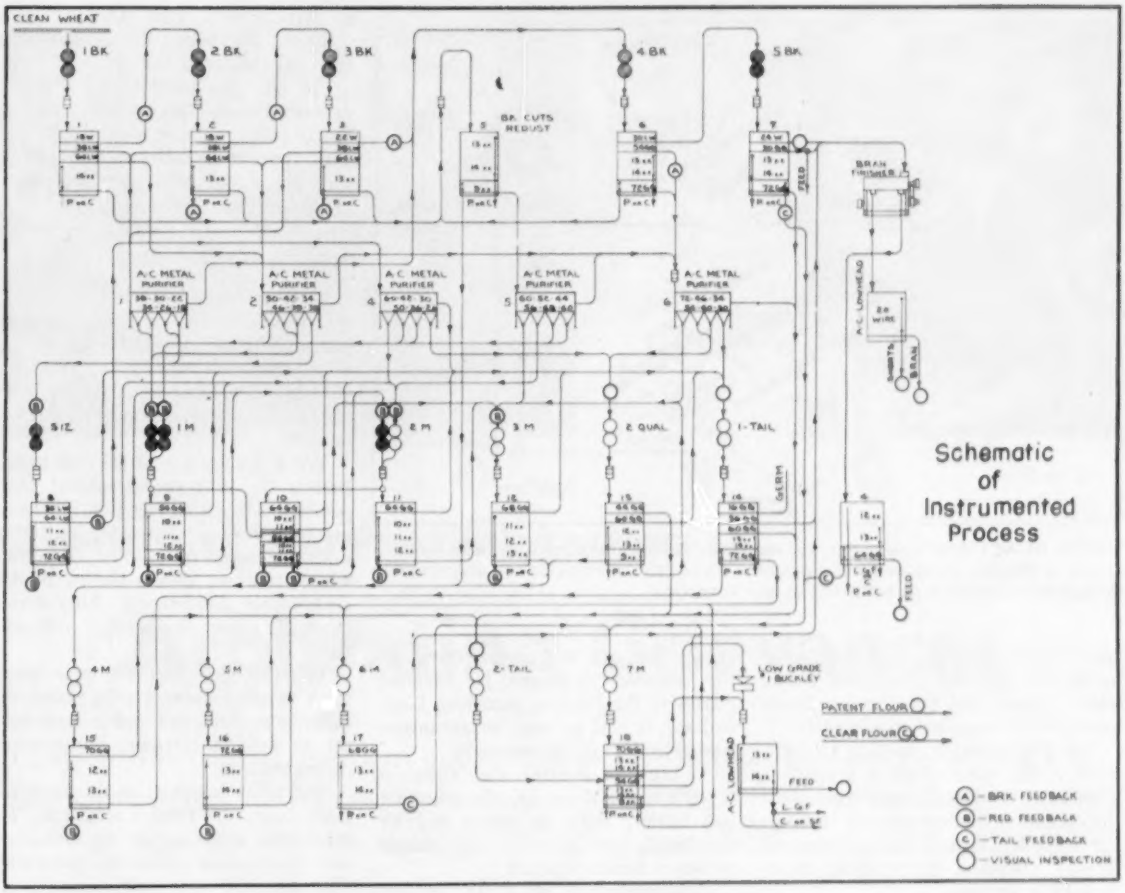
- **Continuous weighing.**

Continuous Flowmeter and Pneumatic Regulator





PUMP-LIKE unit is air-pressure regulated. Above: Meter design. Right: Control system showing the regulator's components and operation.



- **Pneumatic mechanical pressure control.**
- **Pneumatic speed control.**
- **Measurement of partical-size reduction by temperature differentials.**

First, let us examine each of these principles and the instruments through which they are activated. Then we will examine how these controls are integrated into the flour-milling process.

Gaging Rate of Flow

Free-flowing solids, liquids, or slurries are continuously metered by a simple force-balance instrument (Massometer, Wallace & Tiernan), which gages mass rate of flow.

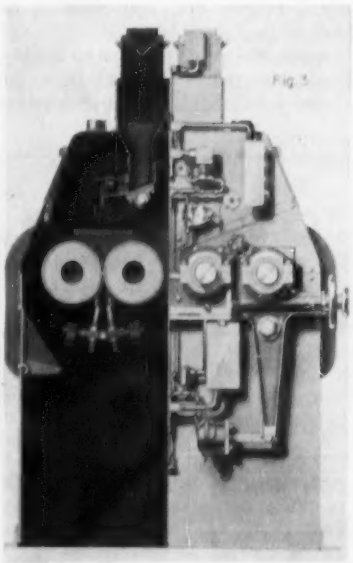
Unit resembles a motor-driven centrifugal pump with a vertical axis of rotation (design shown in Fig. 1).

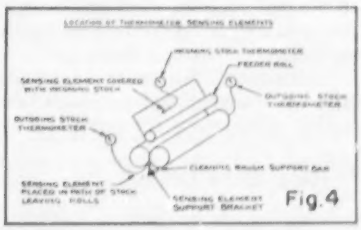
The sheet-metal housing is essentially a cylinder within a cylinder. Inner one contains the motor, geared speed reducer, and most of the force-balancing components. Openings are gasketed to prevent entry of foreign matter. And as an extra precaution, a small amount of air is bled into the housing so that it is under slight pressure at all times.

Structural attachments, designed for minimum obstruction of flow, centrally support the inner housing with respect to the outer. Thus, the annular space between housings forms a passageway for material leaving the impeller.

In operation, entering product falls onto the center of the impeller with practically zero horizontal ve-

Mill's Grinding Pressure, Particle Size Controlled




LOCATION OF THERMOMETER SENSING ELEMENTS
INCOMING STOCK THERMOMETER
FEEDER ROLL
SENSING ELEMENT COVERED WITH INCOMING STOCK
OUTGOING STOCK THERMOMETER
OUTGOING STOCK THERMOMETER
CLEANING BRUSH SUPPORT BAR
SENSING ELEMENT PLACED IN PATH OF STOCK LEAVING ROLLS
SENSING ELEMENT SUPPORT BRACKET
Fig. 4

CONTROL OF SIZE depends on thermometers that gage heat generated in stock—a function of size reduction.

CONSTANT ROLL PRESSURE is obtained by compressed air acting on diaphragms. Force is transmitted through bearing center of movable roll journal.

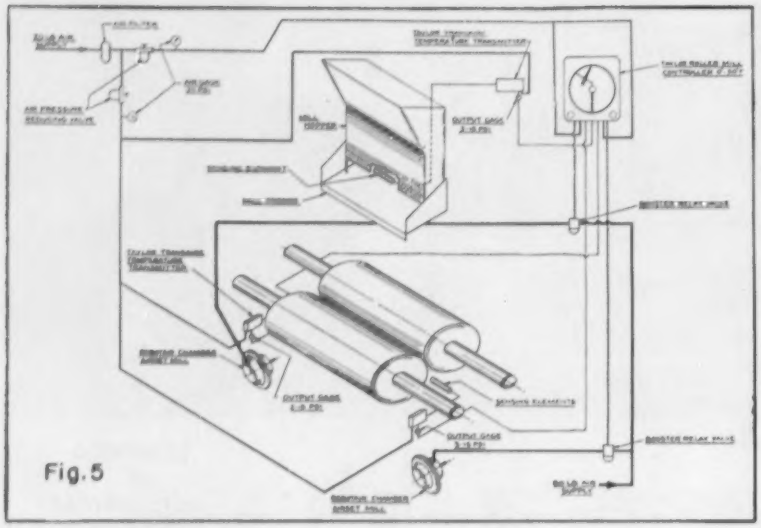


Fig.5

UNITS IN ACTION: Controller, set for predetermined temperature differential, receives impulse from sensing elements. Thus, air in grinding-set diaphragms is instantly adjusted to maintain preset condition.

locity. Then as it passes through, it is accelerated by the vanes and leaves with a horizontal tangential velocity equal to the impeller's rim speed.

Work done in accelerating this material is the force which is measured. This force is directly proportional to the weight of matter passing through the impeller, and is independent of density, viscosity, temperature, or atmospheric pressure.

Motor stator and gear housing are supported in ball bearings, and the former exerts a backward torque equal and opposite to the accelerating force. This torque is opposed by air pressure acting on a flexible metal bellows and suitable leverage (Fig. 2). Pressure is controlled through a valve positioned by a very small movement of the motor stator. Leverage is such that 3 to 15 psi. on the bellows represents zero to maximum flow.

Furthermore, this pressure will operate any conventional pneumatic recorder, indicator, or integrator.

Pressure, Speed Controls

Next, let us consider a constant-pressure device offered in the form of a roller mill (AirSet, shown in Fig. 3).

It is operated on a patented air-pressure principle. Compressed air, either from available lines or from pressure tanks, enters air diaphragms at a predetermined pressure through solenoid-operated control valves. Diaphragms have identical cross-section area of working surface.

Force of the compressed air is transmitted through swing arms and their pivot point. Thus, pressure is exerted through the bearing center of the movable roll journal for effective control of the grinding pressures. Control valves can be run by automatic feed-gate devices, or manually.

Air-pressure control also allows a variable-speed drive for the vibrating pan feeder. Both air motor and air diaphragm are effective by simple means of flexible control.

A combination of these features gives automatic operation regardless of stock-flow interruption.

Particle-Size Reduction

Temperature difference between feed stock and roll-discharge stock is used by Atkinson Milling Co. to control grinding pressures. This is designed to give optimum grinding release.

Again the principle is very simple: Heat generated in the stock by action of the rolls is a function of decrease in particle size. This patented principle can be applied on a continuous basis (as shown in Fig. 4).

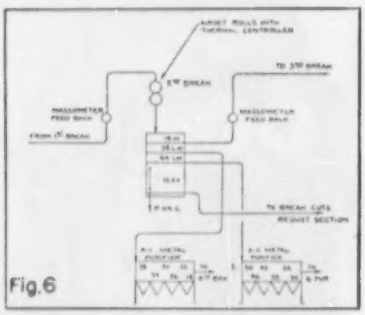


Fig.6

CONTINUOUS WEIGHING provides feedback data that compensate for dulling of roll corrugations, thus giving constant break release.

Special thermometers (Taylor) measure temperature at feed and discharge points with an accuracy of ½%. This type of instrument normally is used on a manually operated, thermally controlled roller mill.

Applying the Controls

With four control principles as our tools, we can start to build flour-mill instrumentation. Initially, let us use a pneumatic system to control mechanical pressure, and temperature differential to measure particle-size reduction.

We introduce a controller, or brain, that is set at a predetermined temperature differential (see Fig. 5). Temperature-sensing elements, or eyes, send an impulse to the controller which, in turn, adjusts the air in the grinding-set diaphragms. This maintains the preset temperature differential.

Whether the control is on a break stock or on reduction rolls makes no difference. Each roll end is separately set to hold a constant temperature differential.

But what happens if the corrugations dull? We need a feedback. To meet this situation, let us introduce our continuous weighing principle. (Fig. 6).

This shows a typical break roll and break-sifter section. We install the mass-flow meter on the first tail or scalp clothing of the break section. Hence, a continuous check on break release from these rolls gives us the required feedback information. And with it, temperature differential may be adjusted to give a constant break release, thus compensating for dulling of corrugations.

Critical Feedback Points

These principles are not restricted to break rolls and break sections, but can be used on reduction rolls as well. However, feedback information must then come from a different point—"throughs" of the flour cloth on second midds, for example. Although temperature-differential and automatic pressure-setting devices should be on all mills, we feel that feedback information should come from the strategic points indicated on our flow-sheet.

Critical feedback points are those required to insure accurate control of break, reduction, and tail segments of the mill. Points which follow are offered as suggestions based on con-

(*Turn to page* 168)

← Arbitrator Justin (left) and AAA V-P Braden

→ FE's Miller

Experts Give You Practical Answers on

Arbitrating Grievances

More of the pointed questions put by FOOD ENGINEERING directly to top-flight authorities on arbitration — and their revelations of the working details of this very effective method for settling management-labor difficulties

PART II OF A TIMELY SERIES*

IVAN C. MILLER
Associate Editor, "Food Engineering"

Most management-labor contracts now include a clause requiring arbitration as the means of reaching final settlement of any difficulties between the parties that are not otherwise resolved.

Even so, not all managements–or unions, either–yet realize all the functions fulfilled by arbitration or understand how best to use them. Further, there are many who do not know the limitations of arbitration and hence when to avoid it.

To get the most practical answers on grievance arbitration, FE interviewed J. Noble Braden, executive vice-president of the American Arbitration Assn., and Jules J. Justin, leading arbitrator and director of the Industrial Relations Workshop at New York University.

Following are more of FE's queries and the answers by these experts–

A Way to Skip Trouble?

Q—Is it possible for management to eliminate grievance arbitration? If so, it is advisable? And how might it be done?

A (by Mr. B.)–Since all of those in both camps are humans, it seems impossible to prevent grievances. And experience indicates that the only satisfactory way to terminate some of them will be by arbitration.

Comment by Mr. J.–In my opinion, arbitration has proved to be particularly adapted to settling management-labor differences. That is why it is so predominantly used.

As in any community where there will of necessity be pulls and stresses and where there must be some means by which one or the other party can obtain redress, so must there be a tribunal in all industrial relationships. And this applies even when the grievance is not a real one.

Further comment by Mr. B.–This whole collective bargaining process, including recognition of unions, is another advancement in democracy, a recognition of the rights of the individual man as a human being.

Our U. S. Government, which is our pride, was set up with three controlling departments–legislative, executive, and judicial. The collective bargaining process is the same type of democratic process.

Collective bargaining develops the body of laws arrived at by the legislature, which is composed of management and union representatives. The executive power is invested in management, leaving disputes and contract interpretation to be resolved by the judiciary branch–by arbitration.

Though it doesn't have to be arbitration, there must be some process (a forum or some other means) by which reasonable, prudent people in industry can run their affairs, settle their differences, and dispense justice.

However, I believe that here arbitration has demonstrated its great values. (*Turn page*)

* Part I appeared in FE Dec. '55, p. 63. Watch for concluding Part III to follow.

Contract Up to You

Q—Will AAA help on the writing of contracts? In particular, your experience should be extremely valuable in the preparation of arbitration contracts.

A (by Mr. B.)—No sir. It's not in our field to write contracts. As for anyone asking about arbitration clauses, we supply the printed rules of the Association. Our rule booklet suggests standard arbitration clauses (Editor's note: See panel at bottom of page).

Should someone submit an arbitration clause to be compared with a standard clause, our legal department will check that clause and advise.

We put our experience to the best use we can. At various universities we conduct classes and programs for both management and union groups. Here we aim to set forth what is good procedure in arbitration, and what should be included or excluded in the arbitration clause.

However, as for the complete terms of a contract, that is something beyond our scope. We consider that we are not even in a position to advise.

It should be apparent that clauses adapted to circumstances which are pertinent in one organization or one plant might not fit circumstances and conditions in others.

Time Changes the Aspects

Q—Why is it that when a contract is very clear on a point, the arbitrator nevertheless may accept testimony as to past practices, which may be inconsistent with the contract? In other words, when an arbitrator carries out his function of interpreting a contract, shouldn't he limit himself to that—considering the past practices only in so far as it may be necessary to clarify ambiguous language in the agreement?

A (by Mr. J.)—In general, where the contract is clear, I contend the arbitrator is bound by delegated authority to apply the language the way the parties have agreed upon.

But, there is ample evidence that differences and disputes between parties can spring from factors other than ambiguities in the language.

Sometimes the parties themselves compromised the language when they wrote the contract—did it deliberately rather than risk a strike at the time. And then they leave it all to the future, hoping some arbitrator can hit on a solution, when they can't work one out for themselves.

This situation often arises out of a clause to which each party has agreed. Of course, here each party interprets the clause his own way.

Also, disputes often arise when the reasoning—rather than language—becomes influenced by changing circumstances. An example will clarify:

Let's say that the seniority clause of a certain company with a hundred employees was suitable and readily agreed upon by both parties at the time it was written. Later on, however, the company becomes more prosperous and expands. And it becomes a part of a multiple organization, so that its employees now number in the thousands.

So—the once mutually satisfactory seniority clause no longer fits the needs of one or the other party. And as a result a dispute arises.

Also, as a result of the new conditions, it is now no longer a question of applying the exact language in which the clause was written—because now neither party really wants the conditions that were considered by that language.

Comment by Mr. B.—I would like to clarify further: A clause in an agreement may be mutually acceptable at the time of writing. However, through management's failure to enforce the stipulated agreement, management has thus waived it. Also, a practice long employed may become an unwritten supplement to the contract.

When Clause Limits Arbitration

Q—Contracts often limit arbitration to settlement of differences between management and labor in their interpretation of the contract. Nevertheless, the union will sometimes demand arbitration on a non-arbitrable grievance claiming that a contract interpretation is involved.

This often leads to court litigation, and obviously, such situations don't help labor relations. Have you any advice here on how to clarify the scope of arbitration clause?

A (by Mr. B.)—This subject has been discussed a great deal over the years. I would say that the question itself should be put to arbitration. Here is why:

Such litigation may drag on for months. Meanwhile, costs and ill-will mount. If, however, the issue is referred to arbitration it can be disposed of within weeks.

Also faced is the question as to whether the difference should be submitted to the particular arbitrator who would eventually handle the grievance. On this there is a difference of opinion. One plan is for one arbitrator to determine whether the matter is arbitrable, and then put the grievance through regular process with a different arbitrator.

The majority of cases, however, are decided by an arbitrator appointed to do both. He first determines whether he has authority to act under the contract. Then

(*Turn to page 206*)

How To Word Arbitration Clauses

These three arbitration clauses are recommended by American Arbitration Assn. as alternatives that may be selected for insertion in collective bargaining agreements—

General Labor Clause: "Any dispute, claim, or grievance arising out of, or relating to, this agreement shall be submitted to arbitration under the Voluntary Labor Arbitration Rule, then obtaining, of the American Arbitration Assn.

"The parties may agree to abide by the award, subject to such regulation as any federal agency having jurisdiction may impose.

"The parties further agree that there shall be no suspension of work when such dispute arises and while it is in process of adjustment or arbitration."

Restricted Labor Clause: "Except for disputes, claims, or grievances concerning (here state matters excluded from arbitration), any dispute, claim, or grievance arising out of, or relating to, disagreement shall be submitted to arbitration under the Voluntary Labor Arbitration Rule, then obtaining, of the American Arbitration Assn.

"The parties agree to abide by the award subject to such regulation as any federal agency having jurisdiction may impose.

"The parties further agree that there shall be no suspension of work when any such arbitrable dispute arises and while it is in the process of adjustment or arbitration."

Limited Labor Clause: "Only disputes, claims, or grievances arising out of this agreement and relating to (here specify the matter that may be determined by arbitration) shall be submitted to arbitration. Such arbitration shall be conducted under the Voluntary Labor Arbitration Rule, then obtaining, of the American Arbitration Assn.

"The parties agree to abide by the award made in connection with any such arbitrable dispute, subject to such regulation as any federal agency having jurisdiction may impose.

"The parties further agree (same as in "Restricted")."

Technical sessions are "hot," both literally and figuratively, as–

Bottlers Weigh Unit, Processes, Problems

Plastic crown liners, improved syrup-making equipment, bottle breakage, liquid sugar, metal containers among subjects ranged

TOP questions of the field were carefully filtered when the American Bottlers of Carbonated Beverages recently convened in Miami. In the technical sessions, plant problems, ingredients, and equipment were specially highlighted.

PLASTIC-LINED CROWNS

Predicting that the plastic liner would someday replace cork, V. C. Guse, Bond Crown & Cork Co., cited the following advantages of plastic:

1. Consistent, uniform, high-carbonation retention.

2. Superior aging characteristics. Plastic won't mold, or pick up or lose moisture.

3. No loose spots nor loose liners. The plastic is bonded to metal shell without use of adhesive.

4. Savings in storage space and in shipping weight.

5. Greater product resistance.

6. Cleaner bottle lips.

Vinyl lined crowns were available in commercial quantities in 1955, and extensive field trials conclusively proved their superiority.

They were introduced in standard shells, enabling bottlers to use them in conventional equipment without making any major changes. In fact, it is possible to use plastic and cork-lined crowns interchangeably in the same crowner.

SYRUP-MAKING TANKS

A lot of engineering has recently gone into the designing of tanks for the syrup room, according to George Pryor, Cherry-Burrell Corp. And a special kind of tank is now available for practically any job in this room.

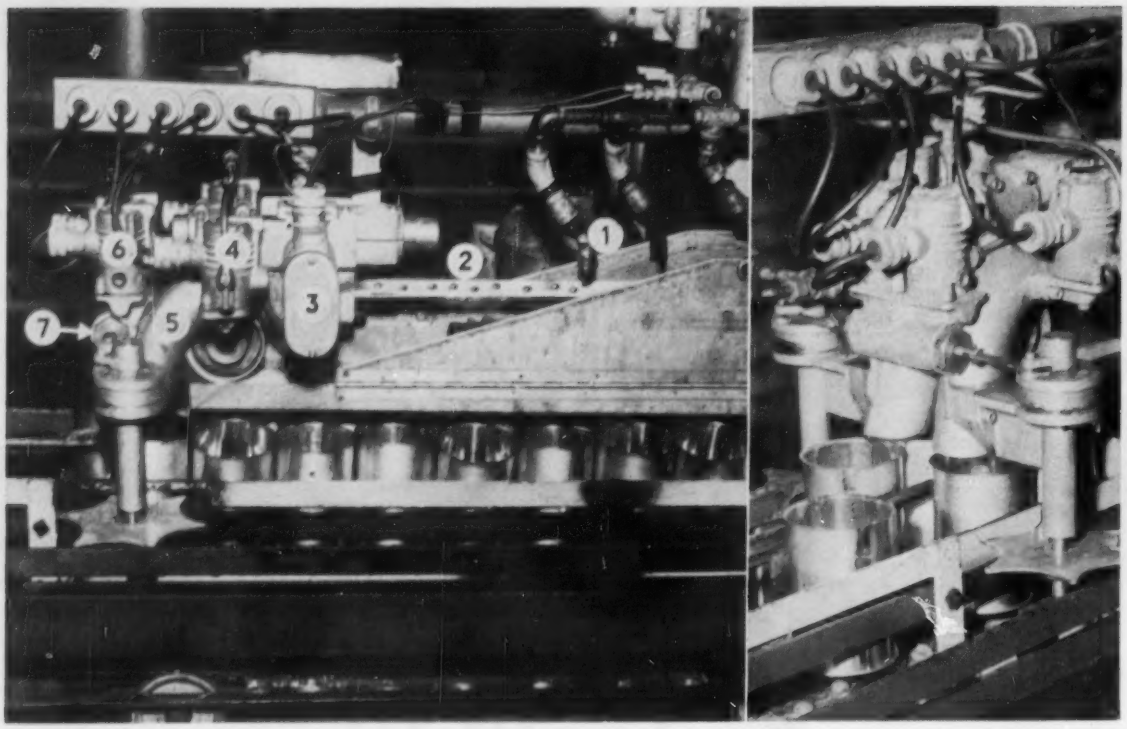
Among such units are: Open top tanks with removable covers; closed ones that may be used for heating, cooling, mixing, and storing; insulated tanks with coils for Freon or ammonia; low rail type vats with built-in automatic cooling systems; and rectangular tanks for use where there are serious space problems.

A late design change that has greatly improved strength and ease of draining products in open style tanks was described. New tank has reverse dish bottom that permits use of a side outlet.

Another advance is a liquid sugar storage tank recommended for long storage of simple syrup. Latest design features a germicidal lamp mounted on a trolley permitting it to

(Turn to page 168)

With this new unit in action →



PRECISE counting and filling of half-cherries into fruit-cocktail cans—1 to 12 pieces, as desired—is carried out by this electronically controlled Hytab equipment. Air jets (1) blow away excess water as cherries move by on belt (2) to pass through photo-eye counter (3). Two solenoids (4) control air jets that alternately blow proper number of cherries into two filling chutes (5). Two solenoids (6) control hydraulic cylinder (7) that operates two starwheels to release cans with cherries alternately from two can lines (closeup photo on right).

Photo-Eye Fills by Count

• Saves 86% Labor • Stops Overfills • Guards Product

Thus Paying for Itself in a Single Season

FE STAFF

For fruit cocktail canners—a new remedy for an old headache.

The old headache has been labor costs and overfill product losses entailed in counting and inserting half-cherries (maraschinos) in cans which subsequently are filled with the other cocktail fruit. This was a job for conscientious workers with very agile fingers.

Two methods have been used for getting the required number of half-cherries into the cans. The volumetric way usually required two operators to put them in 110 #2½ cans or 125 #303 cans a minute on each line. And the manual-count method demanded seven operators on a line to put them in 120 #2½ cans or 160 #303 cans a minute.

The volumetric method resulted in variations of count and usually overfill. And even with a crew of seven operators counting cherries, each one has had to work at top speed. This meant that counts often were made by guesswork, rather than by an accurate tally.

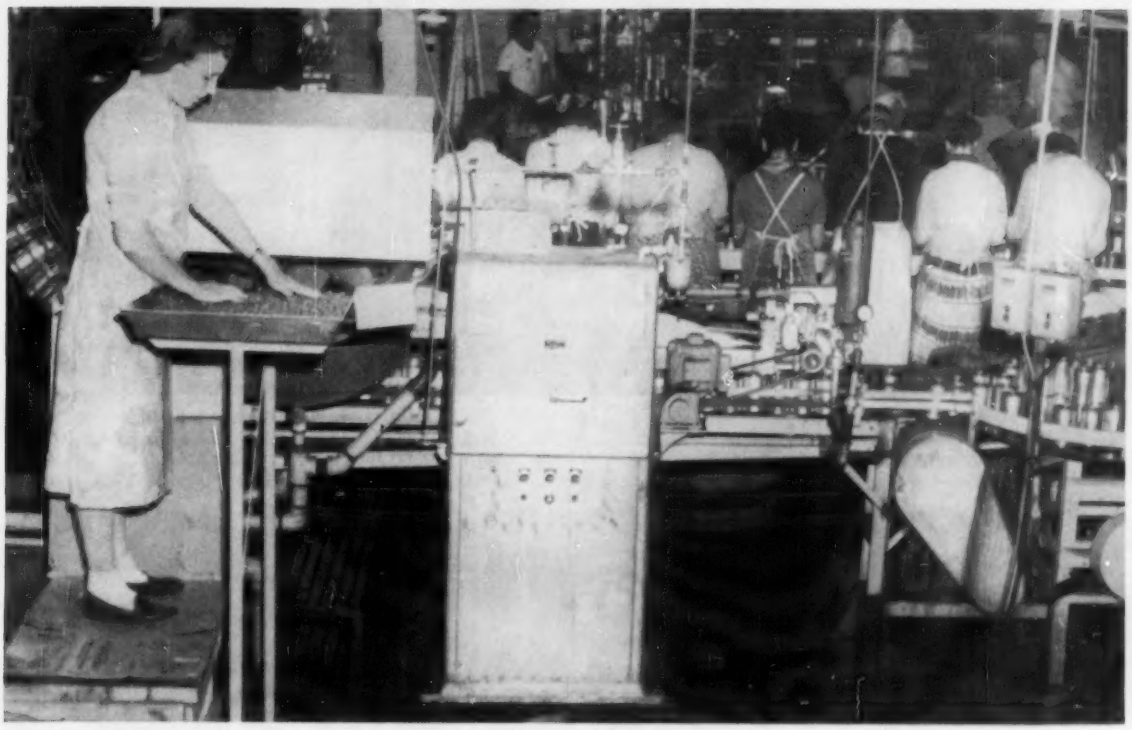
As a rule, the guesstimate was long, rather than short, resulting also in overfill. And because of the element of human error, there were some cases of no-fill.

• FURTHER USES projected for the Hytab unit include counting and filling into containers of other premium fruits, nuts, olives, mushrooms, meat chunks, shrimp, clams, candies, salt tablets, and such other items which, as specialties, call for keeping close tabs on over fills.

The Remedy

—has been the Hytab Cherry Counter & Feeder—employed successfully this season at The Schuckl Co. of Sunnyvale, Calif. This electronically operated machine, manufactured by Magnuson Engineers, San Jose, Calif., has scored these four striking advantages:

1 girl handles . . . . . work of 7



SOLITARY OPERATOR inspects and delivers cherries to rotating feeder-bowl (at her left). Cabinet houses electronic controls. Cans come in from double-drop (far left) and feed at 160 a minute to filler head. Then they're sped to accumulator (right). In sharp contrast, old type line (rear) requires seven girls to count and fill the fruit.

▶ Reduced from 7 to 1 the number of operators required.
▶ Effected product savings that paid for the machine in this one season.
▶ Inserted, accurately and dependably, from 1 to 12 cherries a can, as required.
▶ Assured gentle operation—eliminating injury to the fruit.

In operation, half-cherries are first sorted to cull out unpitted or off-color fruit, then fed into the diagonally mounted, rotating feeder bowl. By regulating feed volume to this bowl, the operator is able to control or vary the filling rate of the machine. This rate need not be closely synchronized with that of subsequent operations as long as the machine maintains sufficient reserve of cherry-filled cans on the accumulation disk supplying the volumetric filler.

Spaced Out in Flow

The bowl delivers a single row of cherries to an inclined flume. The rapidly flowing flume water provides spacing between cherries and accelerates their transfer to the narrow, perforated rubber conveyor belt which carries them to the filler head.

Two can-drops supply two can runs which extend beneath the Hytab to the filler head and thence to the accumulation disk.

Electronics Take Over

The electronic system consists of five separate assemblies mounted on a drawer-like main chassis in the control cabinet. There are two identical power units, along with valve switching, time delay, and counter assemblies.

The main chassis is comprised only of mount receptacles and the wiring system connecting these with operating units. It has no fixed electronic components. The entire system of 18 electronic tubes has no mechanical relays.

In the event of component failure, an assembly can easily be removed and a replacement quickly plugged in. Further, operation of the Hytab has been simplified. It does not require operators with special technical knowledge.

There are four solenoid-controlled valves. Two of these alternate the direction of the air jets across the belt. These jets sweep the fruit first into one filling tube and then into the other. Compressed air is from plant supply, reduced to about 10-15 psi.

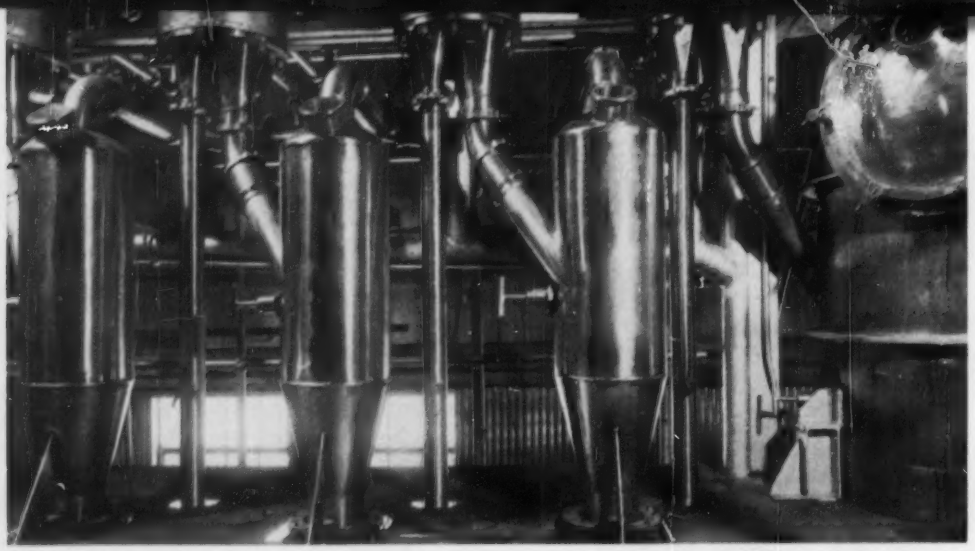
The other two solenoids control the hydraulic valve which operates the two starwheels that alternately release cherry-filled cans from the two can runs.

As the conveyor moves a cherry through the light beam, an impulse is sent from the photo head to the counter assembly. The counter is pre-set (by selector switch) to batch the desired number of cherries per can (from 1 to 12).

When the pre-set number of cherries pass through the light beam, the counter sends a single impulse to the time delay unit. This delay is adjusted to compensate for the distance between the photo head and the air jets (about 3 in.). The delay then actuates the solenoid-controlled valves which alternate the air jet direction and actuate the starwheels.

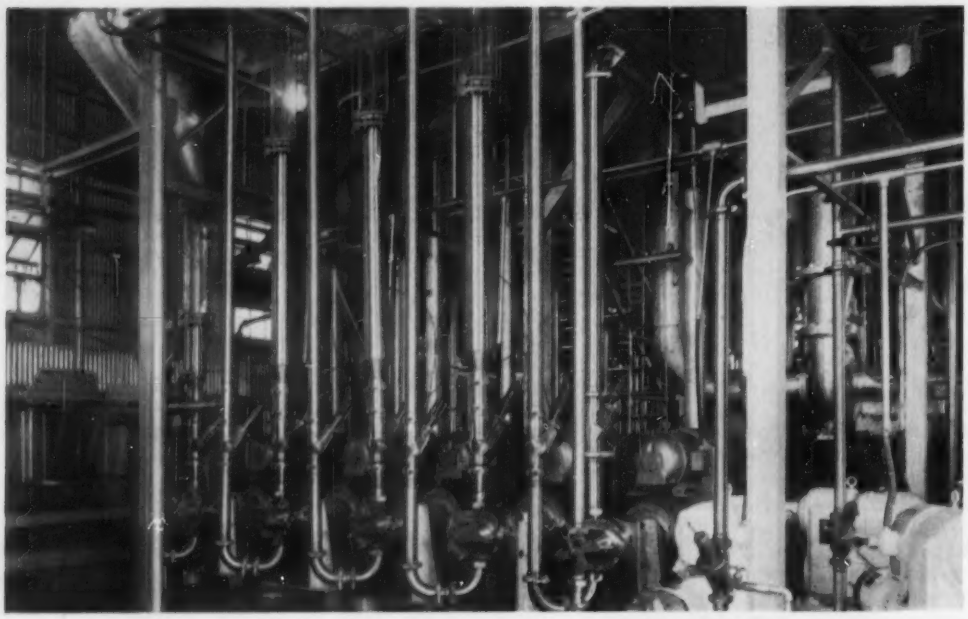
There are two ½-hp. motors. One drives the rotating filler-bowl, the other runs the conveyor belt. The machine is constructed of aluminum and non-corrosive stainless steel.

Its rated capacity when delivering 5 cherries per can (#303) is 800 cherries/min.



JUICE is pumped to heat exchangers (top) through vertical lines, then drops to vapor-liquid separators (above). Vapors are removed at tops, liquid flows to . . .

. . . **CIRCULATING PUMPS** on floor below. Note sight glasses in separator discharge lines (top). Pump speeds are automatically varied to insure desired product viscosity.



Peak-Performance Evaporator. It Spearheads Thornton's–

Mechanizing to Top Efficiency

Advanced engineering of tomato-paste lines lowers costs, boosts product recovery, and improves quality for top-flight California canner

C. R. HAVIGHORST
Senior Associate Editor, "Food Engineering," San Francisco

Manual operations have been reduced to a minimum in the streamlined tomato operations of the enterprising Thornton Canning Co., Thornton, Calif. Single exception in the routine is the assignment of women operators to inspect the tomatoes to insure product quality.

Lug boxes are automatically dumped by pallet loads, and after thorough washing, the tomatoes are elevated to the roller-conveyor inspection tables. Here, undesirable defects are pared and poor tomatoes discarded. Then the conveyor

discharges to macerators, which reduce the product to pulp. All contact surfaces in this line are of stainless steel.

Positive displacement pumps draw the pulp through magnetic traps to remove any tramp metal, then deliver it to the preheaters, from which it exits at varying temperatures, depending on pectin retention desired.

Input-Output Ratio

Flow of raw product to preheaters is controlled at a panel-board, where an operator regulates input volume on instructions by inter-com from the evaporation department.

This is a quality efficiency as well as an operating efficiency. For there is no need for large holding or surge tanks, in which product quality might deteriorate during residence, or where operating difficulties might originate.

Product flows from preheaters to the flash-break heat-exchangers, which also act as sterilizers and pre-evaporators. Then it moves by gravity to a supply tank serving pulpers and finishers.

Heating improves the efficiency of pulpers and finishers. In addition, it aids in recovery ratio and in extraction of pectin from pulp and color from under the skins. After seeds, skin fragments, and other undesirable solids are removed, the juice flows to an evaporation distribution tank.

Juice is first drawn into the heat-exchanger of one of the Buflovak double-effect evaporators. Here it is heated to about 200 deg. F., then discharged behind a baffle (to avoid entrainment loss) to "flash" in the vapor chamber. Product is recirculated in this effect by a steam-turbine-powered pump.

Discharge of product from first to second effect heat exchanger is regulated automatically by a liquid level controller. Temperature here is 190 deg. F. By automatically controlling feed and discharge from this effect the desired output gravity is maintained (see FE Jan. '54, p. 77). In the second (thermosyphon) effect, product temperature is maintained at 125-130 deg. F.

Pulp recirculates in this unit until desired solids content is reached, then is discharged through an afterheater, where its temperature is raised to 198 deg. F. From here it may be valved to a filler for hot-fill canning or to one of two high density vacuum units.

Making High-Density Paste

First introduced to the remanufacturing market about 3 yr. ago, tomato paste having gravities ranging from conventional 25% solids to 50% has resulted in savings in the number of cans and cases required and in freight costs.

In view of customers' demands, Thornton's interest in process flexibility is quite apparent. And since the means of supplying these needs sometimes requires specific equipment and machine modification, a consulting mechanical engineer, is employed.

He keeps the company abreast of the advancing tide of engineering and designs, and he fabricates (in his own or in the company's shop) needed modifications—even new equipment.

Such was the case with the Mojonnier evaporator (FE Feb. '53, p. 73). It was modified to produce high gravity tomato paste at a production volume satisfactory to Thornton. Major change was addition of three pumps (15 hp. total) to maintain proper product velocities.

High gravity paste is now produced without danger of fouling the tubes. This permits continuous operation for a six-day period without need of intermediate clean-ups.

New 4-Stage Unit Employed

Most outstanding recent development is the single-pass, 4-stage evaporator, trademarked Thermovac. Put on-stream only this season, it has successfully concentrated apricot, peach and, especially, tomato pastes to densities of 30% and higher.

Major purpose of this evaporator is to make a product of maximum consistency and gravity without heat injury. While its footage of evaporative surface is conventional, it is unique in the fact that temperatures and velocities can be minutely, accurately, and automatically controlled in all four stages.

Temperatures and velocities are the critical factors in retention of maximum, desirable product color. Exposed to improperly controlled temperature, the product turns from bright red to an undesirable brownish-red.

Because of pending patents, design of the new unit cannot be completely disclosed. However, sufficient information is available to describe its operation:

Feed is from the afterheater of the Buflovak evaporators. Proper velocities are provided by an automatically controlled pumping system that moves the product through the unit in 6 min. Straight-flow, single-pass operation eliminates continued recirculation with its probable undesirable quality effects.

Operation Automated

Two instrument panel-boards automate operation of the Thermovac. One is located on the evaporation-deck, near the panels controlling all other evaporators. Transmission panel is located on the lower operating level, 30-ft. below.

Input pump is manually set to deliver a volume that will result in a product of required gravity. The transmitting panel—equipped with disconnect and reset switches for the electrical system, and differential pressure orifices indicating liquid level in each stage—transmits pump speeds and liquid levels to the control panel.

The pumping system, intermediate to input-output pumps, is controlled by instruments that automatically recalibrate speed of these pumps according to input settings.

All four stages are operated under uniform 9 in. Hg vacuum, but each is under progressively higher steam pressures. Temperature in each stage has automatically controlled ΔT, 200 deg. F. steam temperature and 194 deg. F. product temperature.

As the product is pumped through the first-stage heat-

YOU'LL FIND a graphic flowsheet of Thornton's advanced tomato products operation on p. 102-105.

"There's No Room. . .

—at our plant for obsolete machines, equipment, or techniques," declares Dale G. Hollenbeck, president Thornton Canning Co. "Instead, use of modern equipment and methods is emphasized. And as rapidly as new engineering advances are made they are incorporated—controlled, whenever possible, by automatic instrumentation.

"By far the greatest part of our production is packed under proprietary labels or for remanufacture. And this being a highly competitive market, we work to satisfy our customers by using every means of advancing mechanization and instrumentation to insure high quality.

"Like most canners, we must pack quality, grade, and can size as specified. And so we must have utmost flexibility to produce customers' orders of varying specifications."

exchanger, latent heat is drawn off at an intermediate vapor-liquid separator. This is connected, through a common condenser and vapor line, to the final vapor-liquid separator.

The other three stages are progressively the same. Thus, the vapor from the first-stage separator is fed to the heat-exchanger of the second-stage, etc.

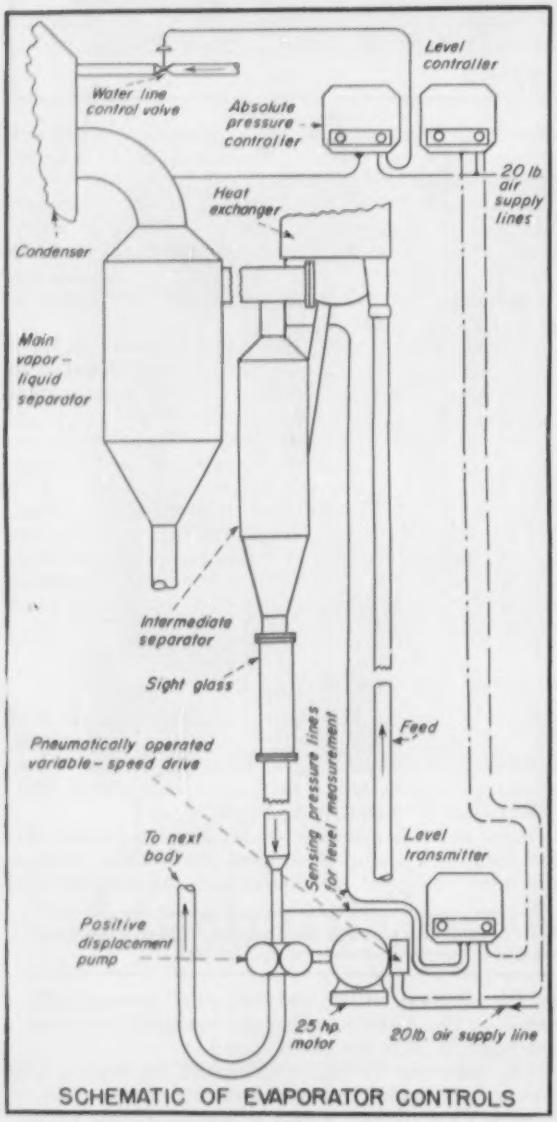
There are five pneumatic control product pumps in the system and one condensate pump. Former are positive-displacement unit. They are mounted so ports are one above the other in a vertical line (eliminating pipe turns or elbows). Thus provided is free flow of material to suction sides. Parts are of 3 in. dia., with increased throat clearances. They are fabricated of No. 316 stainless steel.

Products are canned hot, cooled in a Thermo-Roto cooler, labeled, cased and stored.

The economy of multiple effects and stages, utilizing reduced or condensed pressures from previous applications, affords an overall steam factor of 0.89 lb. steam/lb. of evaporation. This includes process heating before-and-after evaporation, operation of turbines, and cleaning and sterilizing of evaporation units and other plant equipment.

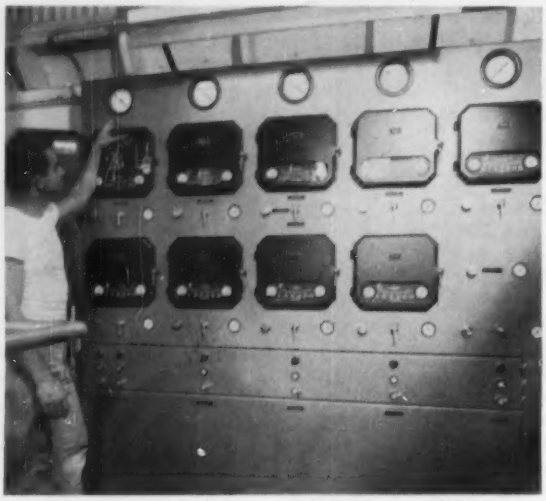
Return of sensible heat through a closed condensate system equipped with heat exchangers, insures reuse of all heat remaining in the system. Condensate is then returned to the boiler water system. Lines are insulated with magnesium or Fiberglas.

New Evaporator Is Automated by Top-Flight Instrumentation

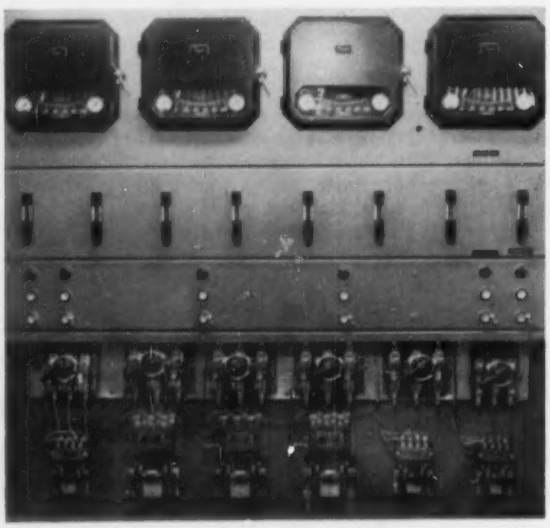


SCHEMATIC OF EVAPORATOR CONTROLS

HOW INSTRUMENTS FUNCTION. Product level is controlled by differential pressure measurements in each stage and controller action on pneumatically-operated variable-speed drives on discharge pumps. Transmitter-receiver provides level indication on ground floor and on operating platform. Pressure within evaporator bodies is controlled by varying flow of water to condenser.



THIS PANEL automates the unit. It contains (top to bottom): Gages, three pressure and one vacuum; regulators, four pressure and one vacuum; level controllers, four liquid; and operating switches and indicating lights. Off-switch has positive lock to protect repairmen.



PANEL at base contains liquid-level transmitters (top). Disconnect and reset switches (above) have Plexiglas cover, enabling operator to detect overheating and rectify trouble without interruption in processing.

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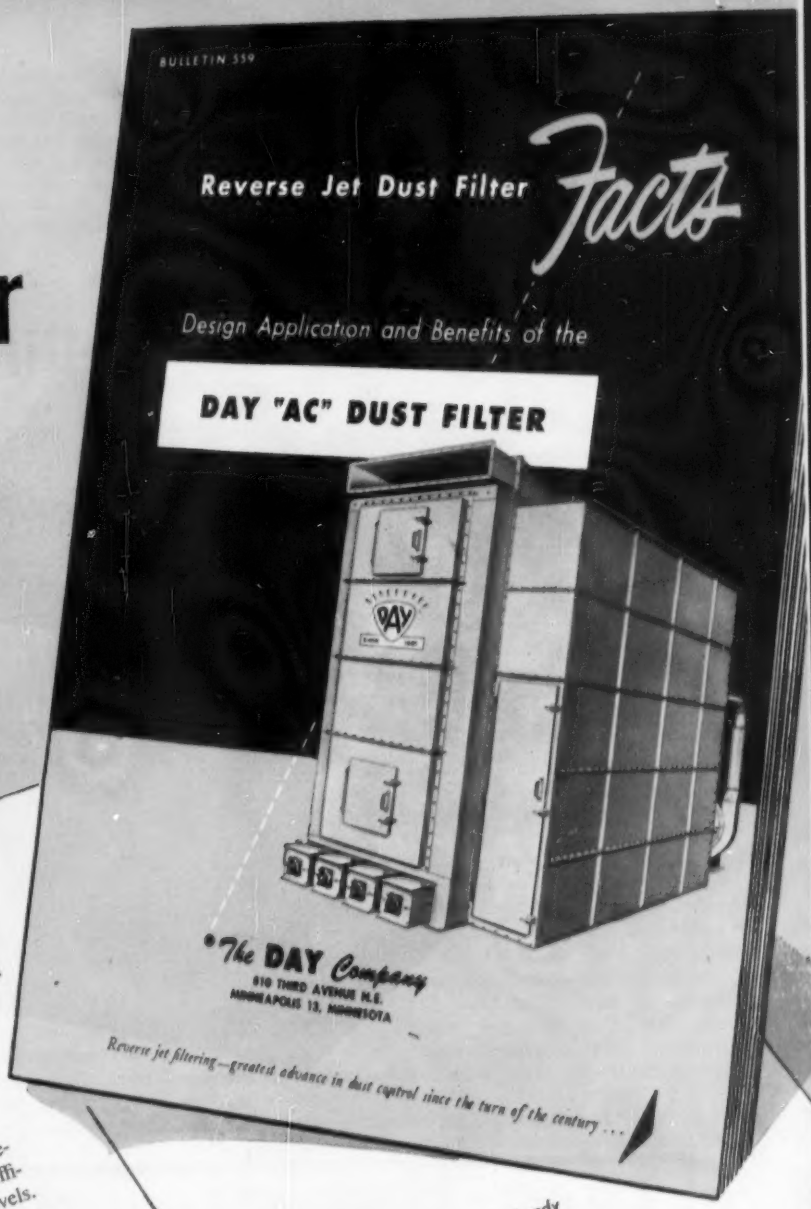
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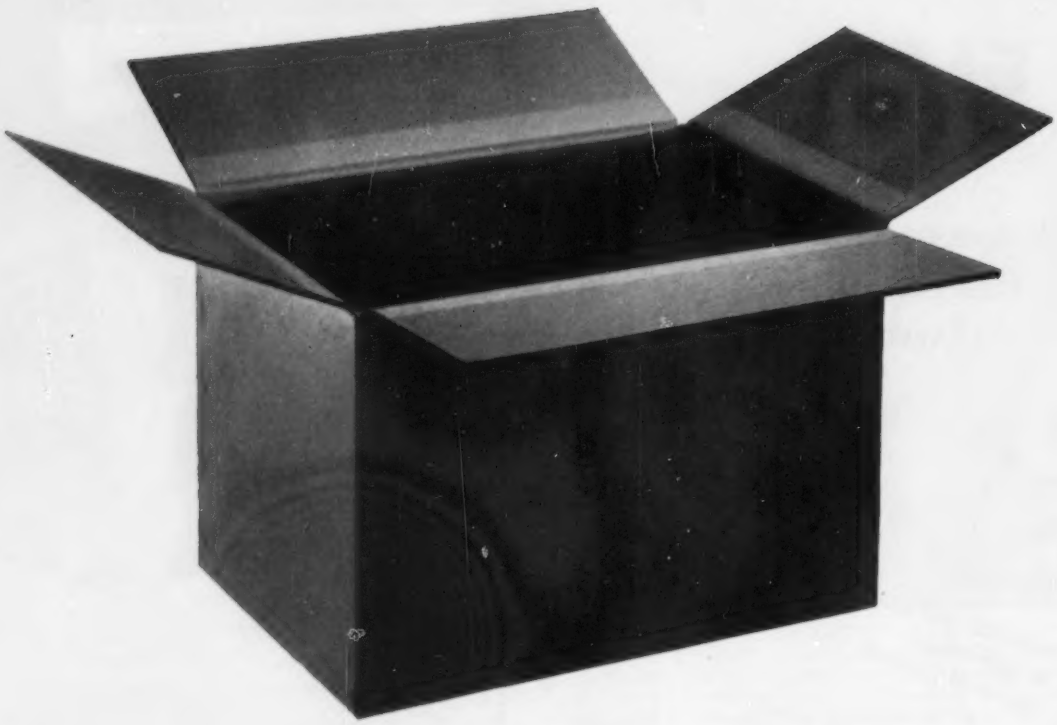

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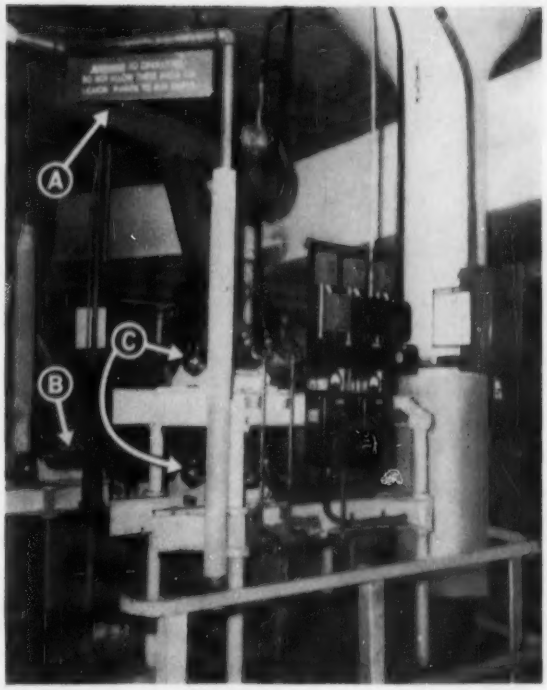
STREAMLINED GRINDING. Roasted cocoa nibs are fed by worm-screw conveyor (A) into single mill (B) turning out coarse liquor, and to tandem mills (C) producing fine liquor for coatings. Liquors are then pumped through heated pipes to attrition mills.



Non-Stop Mills Grind Cocoa Nibs At 1,000 Lb./Hr.

Product is coarse liquor for first-grade cocoas . . . Other units deliver fine liquors for coatings . . . Benefits cited

FE STAFF

Non-stop grinding of roasted cocoa nibs in about one-fifth less space and with minimum machinery maintenance is now being attained at the Milwaukee plant of Robert A. Johnston Co.

Employed are Fitzpatrick comminuting machines. One grinds coarse liquor at a 1,000-lb.-per-hr, rate for production of top-quality cocoas. And two tandem units produce 600 lb. per hr. of fine liquor for chocolate coatings.

Liquors are prepared by feeding roasted nibs from a hopper into variable-speed worm-screw conveyors that continuously charge them into single and tandem mills. On emerging from the mills, the liquors are pumped through electrically heated, thermostatically controlled pipes and into attrition mills.

As a safeguard, permanent magnets have been installed in conveyors feeding nibs to mills and pipes carrying liquors from mills.

Previously, roasted cocoa nibs were ground in three attrition mills, each handling about 250 lb. per hr. These took up considerably more floor space, and required much more maintenance than the new units. And production suffered.

Operating components of the new water-jacketed impact-in-air grinding mills are interlocked. For example, No. 1 pushbutton is for the pump, No. 2 for the lower mill, No. 3 for upper mill in tandem hook-up, and No. 4 for conveyor to tandem mills.

The tandem mills are equipped with indicating ammeters so the operator can make adjustments to obtain maximum capacity. Motors operating both mills are balanced to run at maximum amperage. This has been achieved through experience with the use of various screen meshes.

Installed, too, is a meter for the purpose of keeping tab on the machines' running time. Recorded are the number of hours mills operate during a 16-hr.-day. Thus, proper maintenance—periodic replacement of hammer mills, screens, and felt seals—is carried out in accord with operating time run up on the units, in this way guarding against breakdowns.

Letters to the Editor

Food Firms Discourage PhD Seeking Job

Dear Sir:

In the October issue of FOOD ENGINEERING—and in several other issues — you have stated that there is a shortage of food technologists. My experiences in applying to the food industries in general force me to contradict your article.

Since the completion of my PhD in microbiology (including numerous courses in industrial and food microbiology), I have been applying to the food industry. I have yet to receive a positive reply, and have been obliged to work in another field of bacteriology.

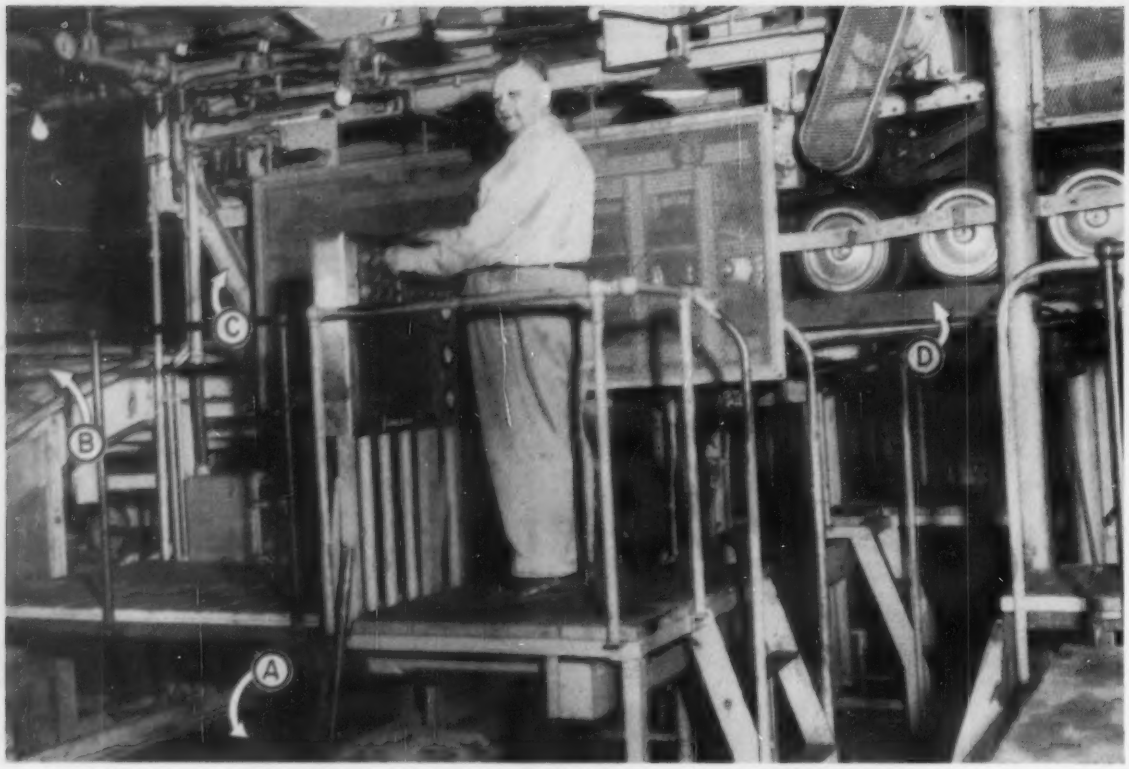
I know of many associates who have tried recently to find employment in the food industry, and they have also met with no success.

Again I say, this seems to be in direct opposition to your statements. Only my recent experiences and those of my associates have moved me to write this letter.—(Name of writer confidential—Editor.)

Comment—Schools graduating food technologists and engineers, several large companies employing technical food men, and a federal survey all reveal a demand exceeding the supply.

But this letter is a challenge to food companies to handle job inquiries or applications from men with technical training in a way that does not reflect industry disinterest. If one firm doesn't need a man, there are others that do.

And associations might take a tip from the New York IFT and act as a confidential information center for jobs wanted and positions open.—Editor.



Takes Just a Push of His Finger on "Automatic"

—then kegs speed onto pallets at 600 per hr. Base pallets are fed from a magazine by drag chain (A) to pallet lift (behind screen). Apron conveyor (B) delivers intermediate pallets (from other magazine) to feeder (C). Barrels on accumulation skids (D) await transfer to pallet lift, on which three-tier loads of 12 kegs are formed. For safety, all moving parts of machine are enclosed in expanded metal guards.

Automatic *Keg* Palletizer Breaks Old Manual Bottleneck

Brewery-built unit takes half-barrels directly from racking, whisks them through palletizer at 600-per-hr. clip. Three-tier load of 12 kegs is then ready either for storage or for shipment in specially designed trailer . . . Machine's components and operation detailed

BRUCE HACKSTAFF

Vice-President, Director of Plant & Production, The F. & M. Schaefer Brewing Co., Brooklyn, N. Y.

An automatic keg-palletizing system, designed and built by personnel of the F. & M. Schaefer Brewing Co., Brooklyn, N. Y., has revamped a strenuous manual chore into a top-efficient operation.

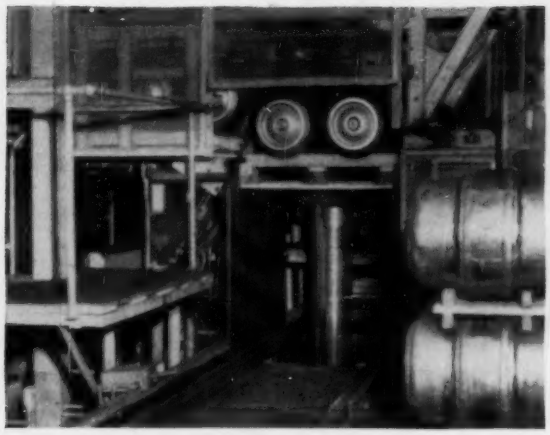
Today, half-barrels (15½ gal.) of draught beer are automatically grouped and transferred to special cradled pallets to form a three-tier load of twelve kegs.

Formerly, these barrels had been conveyed to a 7-ft.-high loading platform, where two men rolled them onto pallets. By this method, a base pallet was placed on a hydraulic lift and loaded with six barrels. Then the lift was lowered to receive an intermediate pallet and a second tier.

Since these kegs weigh about 163 lb., manual handling was a tiring job for the worker and a potential accident hazard. Also, it tended to entail damage to the barrels. Moreover, output was limited to about 150 kegs per hour—far short of that needed to keep pace with increasing production.

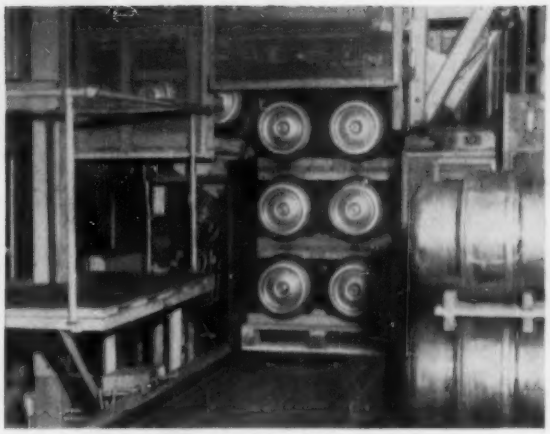
Obvious solution was an automatic barrel palletizer. But our Schaefer engineers quickly discovered that such a machine was neither commercially available nor even in the planning stage. Hence the decision to build their own.

Starting from scratch in 1951, it



Upstroke

—of piston brings first tier of four kegs onto base pallet. Kegs feed from skids (left). Base pallets come in at precise intervals on conveyor (seen behind piston). Intermediate pallets enter from feeder (right).



Downstroke

—ends with three-tier load fully unitized and ready to come out of machine on conveyor (foreground). Loaded pallets continue through to dock for immediate shipment or are picked off and put in refrigerated storage.

took three years of interdepartmental cooperation to perfect this palletizer. But the end result was a unit combining four advantages:

1. It boosts the palletizing rate to 600 kegs per hour (even higher when required).

2. Eliminates the fatigue and hazard of manual keg handling.

3. Curbs damage to containers.

4. And reduces the space requirement for equivalent output.

In view of the need for equipment to palletize units of cylindrical (or modified cylindrical) shape, we of Schaefer invite particular attention to the many advantages of this present machine, which we believe to be the only one of its kind.

In fact, we now anticipate conducting a survey relative to making this machine commercially available to industry, as in the brewing field for palletizing ½ and ¼ barrels.

There is, moreover, sound evidence that it can also be applied in other fields.

Specifically, the designers and builders judge that any rigid, cylindrical package that will roll on a gravity-feed skid may be speedily and practically palletized by this equipment.

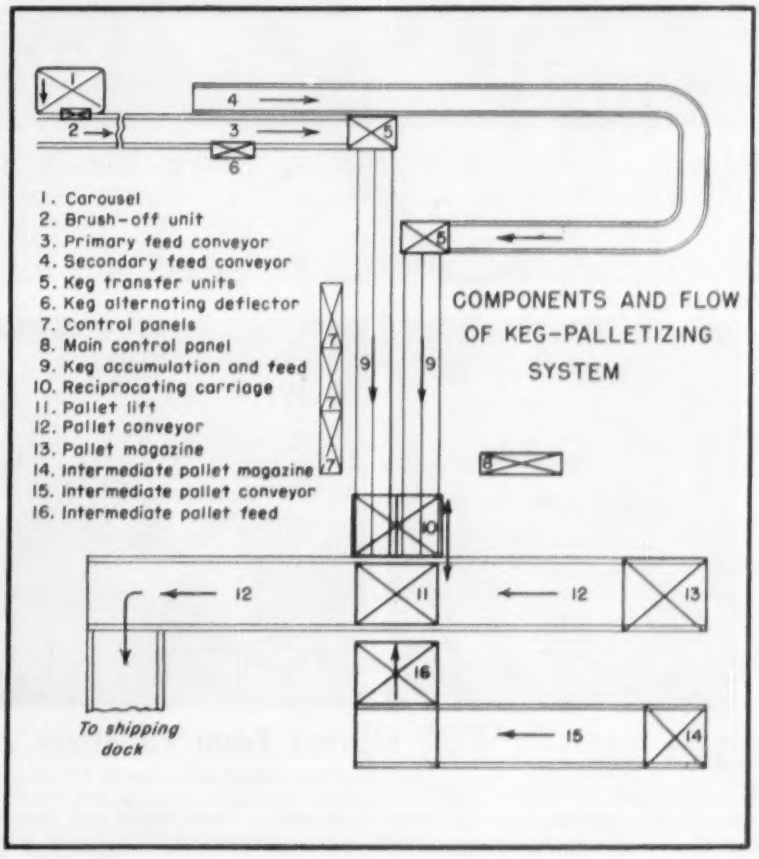
In scheduled operation, an uninterrupted stream of barrels feeds the machine for two working shifts, and one operator monitors the palletizing from a main control panel. Pallet loads leave the unit at about one a minute—ready for inspection, then storage or shipment. And to quote Material-Handling Engineer A. Amato, "it works just as smoothly as a commercial package palletizer".

Kegs are oriented so that tap holes face outward on the pallet. This feature permits subsequent inspection of tap corks for tightness, followed by overlaying of the brand-identifying labels.

System's Components

As shown in the accompanying schematic, barrels are transferred from conveyors to accumulation skids, along which they roll (in two rows) to a reciprocating carriage.

Each unit load requires one base pallet plus two intermediate sections. These are supplied by conveyor from separate magazines, which are, in turn, loaded batchwise by fork-lift truck. The intermediate-section magazine is



loaded with batches of 22 pallets—enough for eleven loads—and a similar operation is used for base pallets. Both magazines have safety doors that further assist in aligning the pallets.

Kegs are tilted on a double-acting cylinder lift table (pallet lift), which receives base pallets directly by conveyor and intermediate sections by means of a pallet feeder. A full pallet load exits on a drag-chain conveyor.

The main control panel may be set either for automatic or semi-automatic operation. All controls are interlocked so that motion of one component is completed before that of the next component begins. Proper sequence is assured by numerous limit switches placed at strategic points throughout the equipment. System is powered by a combination of cylinders (air and hydraulic) and electric motors.

Trouble-free operation calls for a definite schedule of inspection and maintenance. All fittings and moving parts of the palletizer get weekly lubrication, as well as daily lube checks. Then monthly, there is a comprehensive inspection of all components. Finally, an annual check is made relative to replacement of all necessary parts.

All pallets are carefully inspected for defects before being loaded into magazines, since a damaged pallet could jam the palletizer and cause considerable downtime. For safety to workers in the area, all moving parts of the machine are enclosed.

Palletizing takes place in a refrigerated room, which also serves as the storage area for the unitized load.

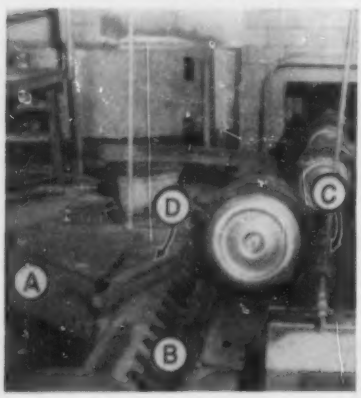
For a closer look at the operation, we will now follow the kegs' path from racking through final grouping:

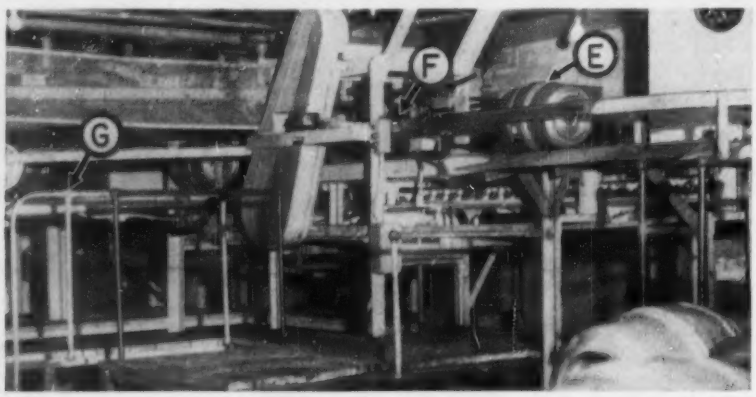
In the racking cellar, which is about 150 ft. away from the palletizer, filled barrels are placed on a carousel—a four-sided continuous conveyor. From the carousel, kegs are transferred by a brush-off unit to the conveyor that feeds the palletizer.

This action is controlled by a limit switch at the machine's accumulation skids. Should barrels on these skids back up beyond a specified point, the switch closes the deflector arm in the racking room to prevent further transfer, and simultaneously stops the feed conveyor. Kegs then continue around the carousel until needed.

Entering the palletizer's feed system, which consists of two parallel conveyors (primary and secondary), the kegs proceed with their tap ends

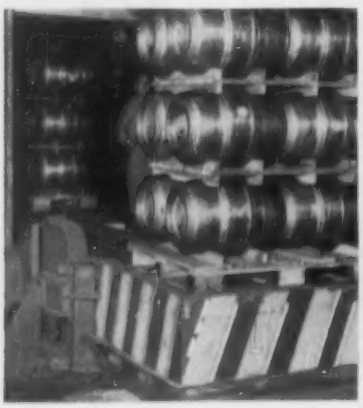
(*Turn to page 188*)

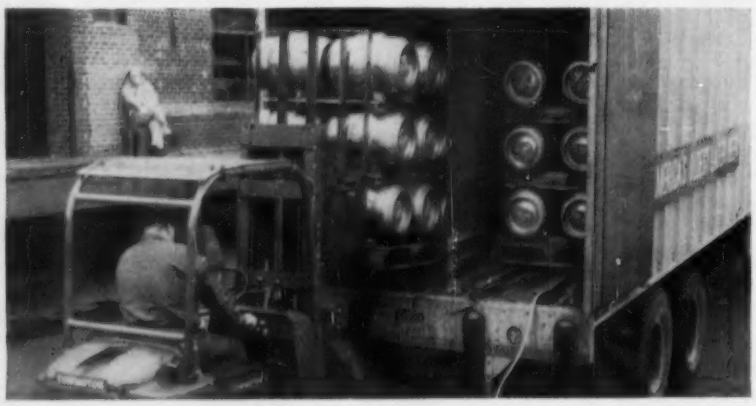




Moving *To* Palletizer . . .

FILLED KEGS are collected via system of conveyors and transfer mechanisms. Left: Brush-off unit (A) in racking cellar shunts filled kegs from carousel (B) to conveyor (C) that feeds palletizer. Should latter overload, deflector (D) retracts, causing kegs to be "re-carouseled." Right: Inside palletizing room, keg (E) on secondary conveyor is seen approaching transfer unit (F) that feeds accumulation skid (G).





Moving *From* Palletizer . . .

FULL LOADS traverse dock and go into truck-trailers with speedy efficiency. Left: Conveyor carries pallets of kegs through portal to outer platform, where fork-truck picks them up and places them directly in trailer. Right: Fork-truck operator pushes palletized load along floor-mounted wheel tracks that extend length of trailer body. Loading pattern compacts 20 units. Ropes (foreground) assist in unloading of trailers at branch depots.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

New B. F. Goodrich belt good for 85% of all food-handling jobs

HERE's the most useful conveyor belt made for the food industry. It's the B. F. Goodrich Highseal, built to handle 85 out of every 100 food-handling jobs, and last longer doing them.

The attractive green color is the first thing you notice about this belt. Lighting experts and color specialists call it "sight-saving" green. By reducing glare and eyestrain, the belt literally eliminates headaches on inspection lines.

A new rubber compound gives this B. F. Goodrich belt good resistance to food acids, most greases, fats and alkalies. It can handle cold products down to zero, as well as hot ones up to 212°.

Food particles can't grind into Highseal's smooth, polished surface. That's why it's so easy to clean. Oily foods, sticky icings, even scuff marks from banging pans, wipe right off with a damp cloth.

For those jobs where oil and grease are not a problem, the B. F. Goodrich Kleenseal is the belt to use. It costs less than the oil-resisting Highseal belt, yet has the same green color and all the other advantages.

It will pay you to find out more about these work-saving, money-saving improvements in food-handling belts. Have a BFG distributor survey your belting needs and recommend the right B. F. Goodrich belt for your process. *The B. F. Goodrich Company, Dept M-530, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

"To build and equip this Quick Freezing and Cold Storage Plant, we have drawn upon the best skill and knowledge of the industry, so that in every essential phase of its structural and operational facilities, it represents the most seasoned and experienced craftsmanship known to quick freezing and cold storage authorities."

ALBANUS PHILLIPS, JR., President
Phillips Packing Company, Inc.
Cambridge, Maryland

Why Phillips chose York . . .

***When Phillips Packing Co.*, the nation's second largest frozen food processor, decided to add 12 million pounds of below-zero storage capacity, York got the job. Here's the story:**

Early this year, Phillips Packing Co., known for foods of quality since 1902, decided to build a new refrigerated warehouse that would double their below-zero storage capacity. York was awarded the contract to install the new 110-ton system.*

Why? There were many reasons. York's unequalled experience in the refrigeration field for one. Since 1885 York has been headquarters for mechanical cooling of all kinds.

Another reason was the dependability of York equipment. Phillips' original Quick Freezing and Cold Storage Plant used—and still uses—York Evaporative Condensers, York Booster and High-Stage Compressors, a York Liquid Recirculating System, a York Automatic Continuous Freezer, and York Ice Plant and Ice Storage Facilities.

In other words, Phillips knew York quality from their own experience. So their new warehouse uses York Evaporative Condensers, High-Stage Compressors and High and Low Pressure Receivers.

Why not put York's custom-engineering service in the frozen food field to work for you? Just call your York District Office (the number's in your classified phone book), or write York Corporation, York, Pa. There's no obligation, just plenty of sound information and practical help.

**Consulting Engineers: V. C. Patterson & Associates, Inc.*

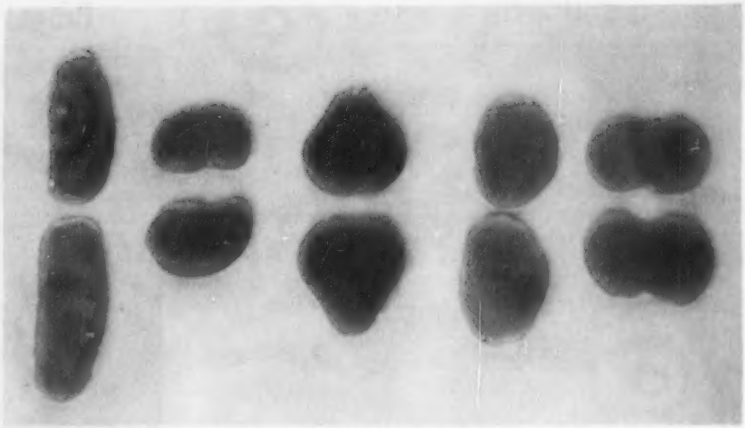
YORK CORPORATION

York refrigeration and air conditioning

the quality name in refrigeration

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

Color changes show irradiation pattern. Used is cathode-ray-sensitive dye, with food-like agar casts showing distribution, penetration . . . Permits covering total surface in one exposure



EXPOSED AND UNEXPOSED AREAS of halved agar-gel casts (simulating irregular-shape foods) are clearly marked by tracer dye, which decolorizes on exposure to cathode rays. Note colorless outer surfaces.

Tracer Technique Gages Raying of Irregular-Shape Foods

F. J. McARDLE and D. E. WIANT

Respectively, Department of Horticulture and Department of Agricultural Engineering
Michigan State University, East Lansing

A simple method of indicating the distribution of radiation over the surface of irregularly shaped foods has proved particularly useful in our study of cathode-ray effects on fruits and vegetables. Rays are produced by an electron-accelerating device.

The technique is especially adapted to products of irregular shape where total-surface exposure is difficult.

Because of the relatively shallow penetrating power of cathode rays, multiple exposure of product usually is necessary for total-surface irradiation. Since our research requires that entire surfaces be treated in a single exposure, we developed a special conveyor system to accomplish this.

But products of varying shapes and sizes present different conveying problems. Thus necessary is quick determination of which areas of a treated item are irradiated so that exposure conditions may be adjusted.

Ray-Sensitive Agar

Procedure involves use of agar-gel casts of the various foods.

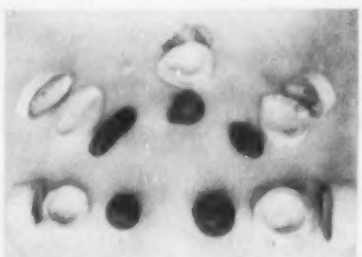
First, we make a plaster-of-Paris mold of the product. Casts are then prepared with agar-gel containing resazurin, and oxidation-reduction dye (10 ml. of a 0.1% aqueous dye solution per liter of 2% agar).

When casts are irradiated, the tracer dye changes from its natural blue color to red, then becomes colorless. Color change depends on the degree of ionization in the irradiated area. After treatment, there is a clear differentiation between exposed and unexposed areas, which may be studied by dissecting the cast.

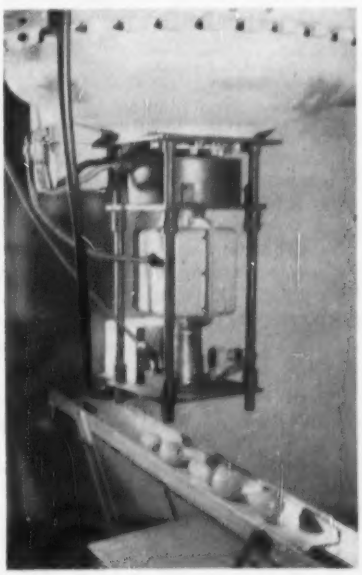
Then necessary conveyor adjustment is made to obtain complete exposure for that product.

This feature is an abstract of Journal Article No. 1841, Michigan Agricultural Experiment Station.

How It's Done

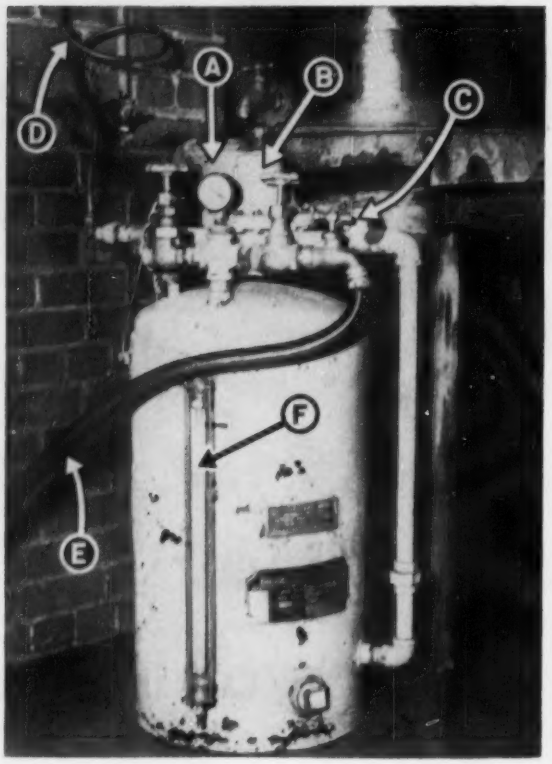


FIRST, accurate replicas of fruits and vegetables are cast with agar in plaster-of-Paris molds. Gel contains resazurin, an oxidation-reduction dye.



NEXT, electron accelerator irradiates specimens on special adjustable conveyor. Later, they are dissected for study.

From this generator . . .



CLEANING FOAM is supplied by this generator. Indicated are filling funnel (A), air pressure regulator (B), check valve (C), air line connection (D), hose (E) for carrying lather to spray-gun nozzle, and solution-level gage (F). ——→

Solution under pressure forms a rich lather that speeds cleansing of vehicle bodies and reduces both labor and outlay

5¢ Per Sparkling Truck

That's Biltmore's Low Cost for Detergent

C. K. LANNING

Superintendent of Transportation,
Biltmore Dairy Farms, Asheville, N. C.

The new type truck cleaning system recently adopted at Biltmore Dairy Farms, Asheville, N. C., has these specific advantages over the old method:

▶ 1. Cleaning time per truck has been cut. 2. Detergent waste is minimized. 3. Cleaning is more thorough. 4. The job is now less fatiguing to the washers.

Accordingly, trucks are now "foamed" spic and span at an average rate of four per hour. Expenditure of detergent is carefully regulated by devices on the unit. And foam from an 11-gal. charge of solution will clean approximately 20 trucks, bringing the detergent cost down to about 5c. per truck.

Contrast of Old Way

Formerly, the truck cleaning and washing involved the time-honored bucket and brush, with plenty of manual work.

And as all those who have used such washing methods know, much cleaning solution was constantly lost by dripping from the brush as it was moved between bucket and truck.

Further, this was a slow operation. And there was the further disadvantage that the cleaning solution would often streak and dull the appearance of the paint. Biltmore remedied this with a new detergent application.

Here is the new way detergent is applied—

Working Details

First, the operator rinses the truck with cold water. Then a foam-like lather is sprayed in a few wide sweeps over the surface of the truck. This foam is then spread with a brush and allowed to soak for a few minutes before the rinse, which removes dirt, soil, road discoloration, etc.

Now to details of the heavy-lather-making unit (manufactured by Oakite Products, Inc., New York City).

Fitted on a platform approximately 3 ft. above the floor in the garage near the outside washing area is a 50-gal. open-top drum. This is equipped with a draw-off faucet that extends beyond the edge of the platform and over the filling funnel of the foam generator.

The lather-maker consists of a 14-gal. foam-generating tank, a foam-discharging gun, and a length of hose. The

. . . road-grimed trucks . . .

A SOILED TRUCK is like an unclean bottle, in the view of this dairy. Washing is mandatory.

. . . are sprayed with lather . . .

DETERGENT FOAM is rapidly sprayed over truck's surfaces, after initial cold-water rinse.

. . . that's spread to soak . . .

LATHER is firm enough not to run. It's now spread over entire body with long-handled brush.

. . . rinsed—and truck gleams

RINSED TRUCK is spotless, free from streaks. And three more will be cleansed before the hour's up.

detergent lather is produced by introducing compressed air into the cleaning solution in the tank through a pressure regulating valve.

This foam maker is installed inside the building near a compressed air outlet, and its 50-ft hose extends to the washing area, with plenty of length for maneuvering. The compressed-air line is connected directly to the unit's air inlet.

When the foam generator is in operation, compressed air passes through a regulating valve, then through a check valve, down the outside of the tank, and finally is piped into the vessel near its bottom.

On the inside of the tank, the air pipe is perforated, giving a pressure-regulated discharge through many small openings, and thus creating a predetermined quantity of foam.

About the Detergent

The detergent solution—8 oz. of Oakite Composition No. 70 per gallon of water—is made up in the 50-gal. open-top drum and drawn off through the tap directly into a funnel attached to top of the pressurized machine.

The stock solution may be prepared in several ways. The fastest is to use steam to dissolve the detergent in a small amount of water and then fill the drum with water to the desired level after the material has been brought into solution. If steam is not available, hot or cold water may be used.

The temperature of the stock solution should not be less than 65 deg. F. when used, since a lower solution temperature will not produce the desired foam and will therefore waste solution.

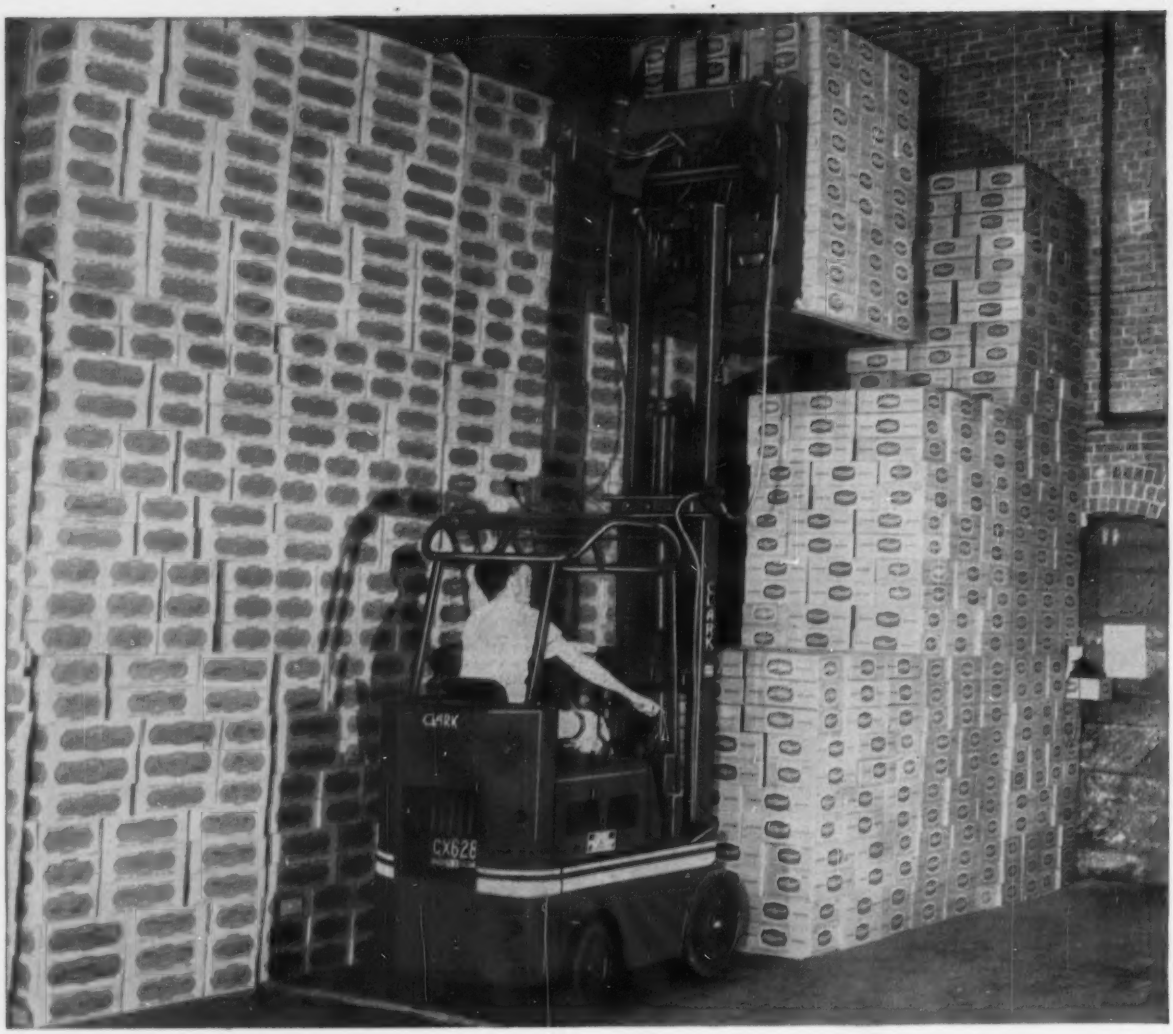
It has been determined that best results are achieved when the unit working pressure is 35 psi. At lower pressures, less foam and dryer foam is produced, whereas higher pressures result in wetter foams. These latter are not as efficient and so are less desirable for this work.

Heavy Foam Best

It has also been found that dense foam tends to cling to the sides of the trucks and without running down the sides to be wasted on the ground.

Once the generator has been charged and the air valve turned on, the operator takes the gun and sprays as he walks alongside the surface to be cleaned. Then come a few swipes with the long-handled brush, followed by the rinse—and the job's done.

Results of this washing method are gratifying to the operator, since the soaking foam actually does the bulk of the washing work.



CLARK'S PUL-PAC SYSTEM

...cuts labor and pallet costs $39,000

Operation is simple. The Pul-Pac grasps an edge of the fiberboard pallet and pulls it onto the truck's forks. To unload, the Pul-Pac pushes against the load, and the material slides into a stored position.

Clark's Pul-Pac system enabled Narragansett Brewing Co. to convert to fiberboard pallets for their materials handling operations.

HERE ARE THE SAVINGS that Narragansett reported:

- **Labor time cut to 20 man-hours per freight car—a saving of $20,000 per year.**
- **Pallet investment cut from $21,000 (wooden pallets at $7) to $1800 (fiberboard pallets at 60c)—a saving of $19,200.**
- **Other savings: increased storage space, reduced damage to supplies, and lower pallet maintenance cost.**

Clark's Pul-Pac is typical of the complete line of attachments designed to make your Clark equipment more versatile, more profitable. Get full details by calling your local Clark dealer today.

Industrial Truck Division

CLARK EQUIPMENT COMPANY
Battle Creek 14, MICHIGAN

CLARK EQUIPMENT

Meat Packers Tackle Vital Issues

Subjects of broad interest to meat packers—and to food processors in general—got an active going over at the recent annual meeting of the American Meat Institute in Chicago.

Given top billing were talks on automation, new processing techniques, cost control, and future meat supplies.

Informative talks delve into:

- **Automation**
- **Electrostatic Smoking**
- **Pure-culture starters for summer sausage**
- **Radiation sterilization**
- **Weekly profit-and-loss forms**
- **Future meat supplies**

Automation: A Must

The challenge of the next 20 years—greater productivity with a fixed labor force—can be met only if industry automates now, asserted C. E. Evanson, T. A. B. Engineers, Inc., Chicago.

Defining automation as mechanization plus a tremendous extension of man's senses, he cited the need for closer quality control through elimination of human inefficiency.

Process controls in the sausage kitchen enable more consistent formulation than is possible with any human operator. Skill and experience in developing the formula are used just once. From then on, equipment does the work, with controls insuring that machines adhere to the process. And the same principle applies all along the production line.

Today, a completely automated sausage kitchen is limited only by lack of a casing that can be fed and stuffed continuously and automatically. When that is developed, sausage manufacture will be automated from kitchen operation through packaging, since automatic means for linking, handling, weighing, and packaging already exist.

With proper controls, processing of relatively small quantities of various sausages can be automated as efficiently as larger operations in which one type is made on each line.

Small runs of different formulas can be handled by a punched-card system. Each card, representing a formula and process, carries a product through its specific operations. Automatically controlled are such variables as formula, weight, temperature, and time.

Goods need not be fluid, semi-fluid, or even uniform to be adaptable to automation. Consider, for example, the manual operations involved in processing the non-uniform bacon belly.

However, this manual handling will be eliminated by a line soon to be unveiled.

In this new operation, cured bellies will automatically be segregated according to weight, transported through an automatic smokehouse, next go into a quick-chill unit. From there, they will go to a press, then directly to a slicer. Finally, slices will be counted, weighed, and packaged—all automatically.

Static Smoking: Pros and Cons

Advantages of continuous electrostatic smoking, as well as some of its unresolved problems, were presented by Dr. M. C. Brockman, Kingan, Inc., Indianapolis.

For meats which do not require heating to a definite temperature during smoking, this process can be recommended without reservation. However, with products such as bacon there are negative aspects associated with continuous infra-red heating rather than the electrostatic process.

Extensive studies indicate that sliced bacon prepared from continuous-process bellies is as acceptable to the consumer as that made by batch processing. Flavor imparted by electrostatic smoking is indistinguishable from that conventionally produced. Moreover, the electrostatic process is readily adaptable to continuous smoking of meat.

Handling cost of continuous-process bacon is about half of that incurred in batch processing. Operation is flexible since no fixed numbers of bellies are required, in contrast to that in a batch smokehouse where a fixed load is necessary for most efficient processing. Moreover, capital expenditure for the continuous system is substantially less than for conventional smokehouses of equivalent capacity.

In addition, there are several potential advantages not yet completely evaluated.

Any fat which drips from bellies prior to entering the smoking chamber can easily be recovered as an edible product. And electrostatic deposition offers a far greater range of smoke flavor than is practical in batch smokehouses. Finally, since heat processing is so rapidly completed, it is bacteriologically feasible to prepare smoked meats without added salt.

On the other hand, the infra-red heating system presents several production problems.

First, appearance of the unsliced bacon differs somewhat from that of the conventional product. There may be a difference in texture on the fat side. Slicing yields tend to be erratic although there is evidence that this might be overcome by lower slicing temperature and more careful handling. Furthermore, it is probable that infra-red heating does not provide an adequate margin of safety for odd-size bellies within a given weight class.

Short, unusually-thick bellies may not attain adequate internal temperature or dehydration. This points to an even more severe problem in continuous infra-red processing of bone-in hams, which vary considerably in thickness.

Quicker Sausage Production

When given BAI approval, *Pediococcus cerevisiae* starter cultures will be ready for field trials in summer-sausage manufacture, said C. F. Niven, Jr., American Meat Institute Foundation, Chicago.

Salt-tolerant strains of these bacteria grow rapidly in sausage emulsion as they are subjected to the usual "cold" smoke. Test results indicate better flavor development and

greater firmness in the sausage samples thus inoculated.

In addition, use of this starter culture eliminates the 3 to 4-day holding period prior to stuffing. Since smoking can be shortened from 3 to 2 days, finished sausage may be made within 48 hr. after original trimmings are chopped.

In this work, starter was uniformly sprinkled or sprayed onto the emulsion as it was mixed—the only additional step required. Bacteria were first centrifuged from a broth and then resuspended in a small quantity of distilled water. From 0.1 to 2.0 pt. of culture was used per 100 lb.

Starter culture can be freeze-dried and kept in a dry, powder form indefinitely. Although costly, this method may prove the most practical.

Ray Sterilization: More Work

When all of the technical difficulties of sterilizing meat by radiation have been overcome, the ultimate use of this process in preference to other methods will still depend upon relative cost factors. And these are yet to be determined, according to Dr. R. Tischer of the QMF&CI, Chicago.

As an example of a successfully irradiated meat, he cited bacon, which may be sterilized with no apparent loss of quality in the fried product. If off-flavors do exist in the raw product, they are dissipated by the time it is cooked.

Weekly P & L Statements

An accurate and rapid guide to business administration has been our weekly profit and loss statements, reported K. R. Woodruff, Hygrade Food Products Corp., N. Y. C.

The added cost of taking weekly inventories at a 3,000-employee plant was estimated at only $200 a week. In return, the system offers . . .

(Turn to page 143)

• • •

IN PACKAGING large bags of such produce as spinach and cole slaw, girls remove sacks from conveyor (background), then fit label over ends. Reel-wire stitchers crimp staples through bag and label for tight seal.

SMALL BAGS are closed by staplers, using pre-formed fasteners. Girls alternate on unit, twisting bag necks and securing each with single staple.

Tight, Low-Cost Prepackaging —*With Fast Stapling Machines*

SWITCHING from wire-twist-and-tape closing methods to stapling has given new speed in prepackaging vegetables at Vitamin Queen Co., Detroit.

Further, this system of fastening produce bags and master cartons economically provides a tight seal that keeps vegetables fresh longer.

The company now turns out about 6,000 cartons of produce each 8-hr. day. Twelve staplers and wire stitchers (Bostitch) do the job. Employed are 50 women and 10 men.

All produce is washed and bagged before being placed on slow-speed conveyors that carry the cellophane sacks to one of two sealing lines.

On the first line (see left photo), three bench-type stitchers, equipped with foot-operated solenoid switches, close large bags of produce at the rate of 1,800 sacks per hour—600 per machine.

Originally, foot-operated staplers, using pre-formed fasteners, were tried at this point. But present reel-wire stitchers have proved to give 25% more production. They trim costs, too, because roll-formed staples cost only one-sixth as much as the pre-formed units.

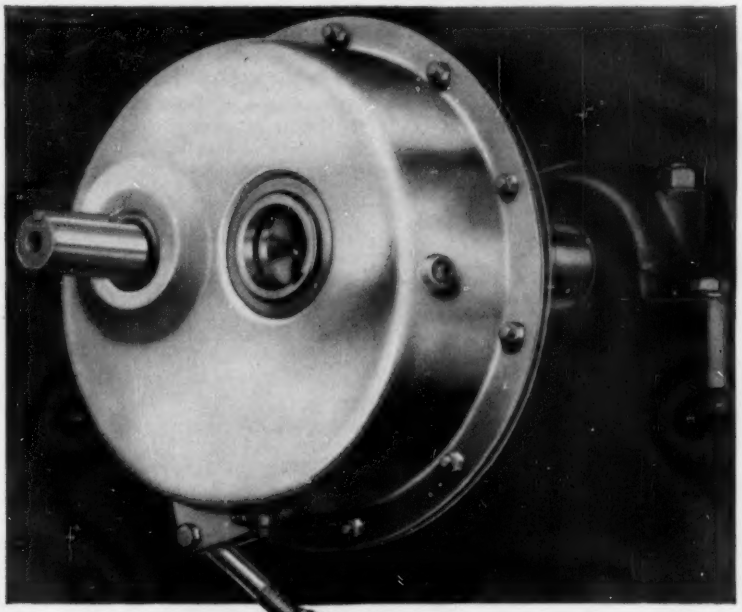
On the second line, however, stapling machines using pre-formed fasteners fill the bill for closing small bags of vegetables (right photo). And 5,500 packages per hour can be turned out on two staplers operated by four women. This is twice as fast as the old-style procedure using hand-applied wire twists, declares Dominic Mangi, Vitamin Queen general foreman.

Also, staples are 26¢ per 1,000 cheaper than the wires—a substantial saving over the long run.

Finished packages travel by conveyors to a cartoning section. Here, two dozen bags are stacked in each 16x12x12 in. master carton, which has been previously bottom stitched.

Formerly, tapes were used to close carton tops, and two girls were employed to maintain the necessary 300-box-per-hr. rate. But it was found that during cold weather tapes would not hold during shipping.

Now, a special "Autoclench" stapler (with foot pedal) is used to firmly seal cases. One woman only is needed to meet production.



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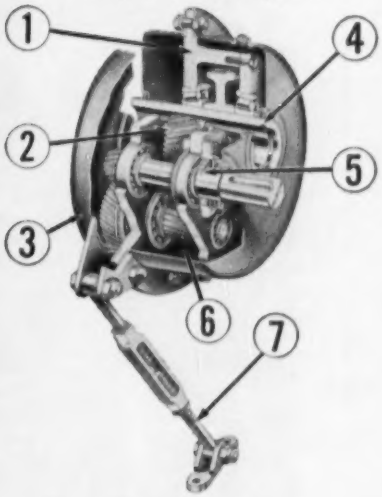

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2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

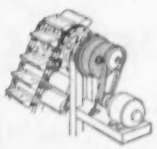
4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

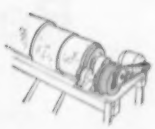
6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

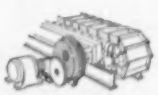
A FEW TYPICAL APPLICATIONS



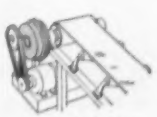
BUCKET ELEVATOR



SAND CLASSIFIER



APRON FEEDER



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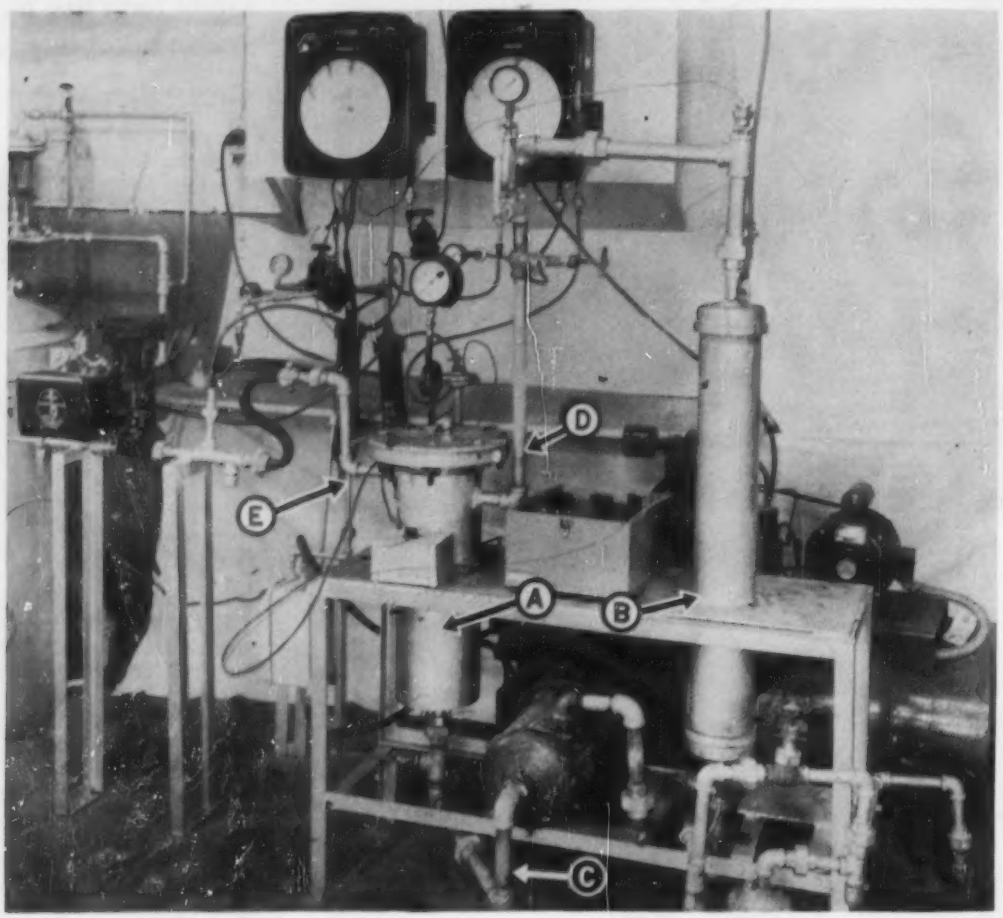
SPECIAL WATER-AND-AIR RETORT used in experiments. It comprises retort (A) and heat exchanger (B). Water is pumped (C) from retort bottom through exchanger, where it is heated by high-pressure steam. Hot water enters retort top at (D). Compressed air is superimposed above water level at (E), and exerts pressure of 30-32 psig. in process. Proportional controllers regulate temperature, pressure.



This Lab Rig Blazes Way for—

Retorting Foods in Plastic Bags

Latest study points up sealing, filling, heat transfer, and sterilizing problems . . . Details unique superimposed-air retort system

A. I. NELSON and M. P. STEINBERG

Department of Food Technology, University of Illinois, Urbana

We now know that both acid and non-acid foods can be heat-processed in plastic bags.[1]

And though present-day films are not designed for such severe service, two of them—Mylar A (Du Pont) and Trithene A (Visking)—reveal these four desirable features:

1. They stand up to processing temperatures (250 F.).
2. Impart no off-flavor to product.
3. Can be heat-sealed.
4. Permit rapid heat transfer.

However, the initial investigation[2] uncovered several problems relative to strength of heat-sealed seams, filling, and general handling that must be solved before such processing can become commercially possible.

Experiments detailed here shed further light on these plastics' drawbacks.

Both films were obtained in sheet form. Mylar was supplied in 200 and 300 mil thicknesses, Trithene in 200 and 400.

Plastic bags were formed of these materials by folding rectangular sheets and sealing two sides with a manually operated, thermal impulse sealer (Vertrod Corp.). This unit gives a short but powerful heat impulse that welds two thicknesses of film together in a fraction of a second, and permits seam

to cool under pressure of the sealer.

In the tests, width of sealed area was about $\frac{7}{8}$ in. And two seals, about $\frac{1}{8}$ in. apart, were made in each of the open sides of the bag. It may be noted here that hand operation of the sealer made uniform sealing difficult.

Plastic Strength Gaged

After seaming, bags were tested by immersing them in water and filling them with air.[8] Presence and location of leaks were noted by observing bubbles. Our table shows average net air pressure at which bags started to leak. It should be remarked that standard deviations are high. This indicates that bag seals were not uniform. Probable cause is the variable pressure applied to the hand sealer.

However, in no case was any general weakness seen in the film. All failures occurred at or near the seams. Those near seam were apparently caused by film being weakened during sealing.

Significantly, leaks developed at rather low internal pressures (maximum was about 5 psig.). This posed a question regarding pressure needed to burst the general film area.

Accordingly, a special chamber was constructed to make this test. It was equipped with a head allowing film to be clamped over a round opening of $1\frac{1}{4}$ in. dia.

Air was injected into the chamber. Then a laboratory test gage registered inside pressure applied to the film.

Mylar, of 200 mils thickness, was the film tested. And three pieces of this material withstood pressures slightly over 40 psig. without bursting. Higher pressures could not be obtained with the apparatus.

These tests reveal that whereas general strength of these two films is good, the sealing must be improved. For if this seam area could stand pressures similar to that of the general surface, a major stumbling block to this type of processing would be removed.

Now to actual processing problems:

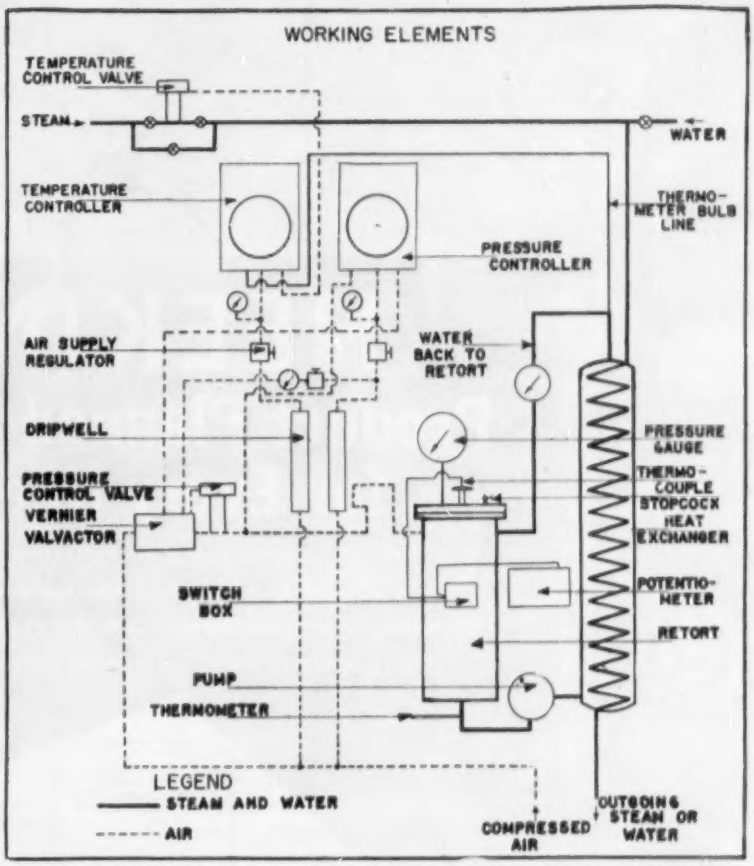
The non-acid food—a potato-meat stew—was raised to boiling temperature, then allowed to cool to about 160 F.

At this temperature, plastic bags were filled with product and immediately sealed with the impulse heat sealer. Here, it was noticed that if food material remained in the seam area, a

(*Turn to page 140*)

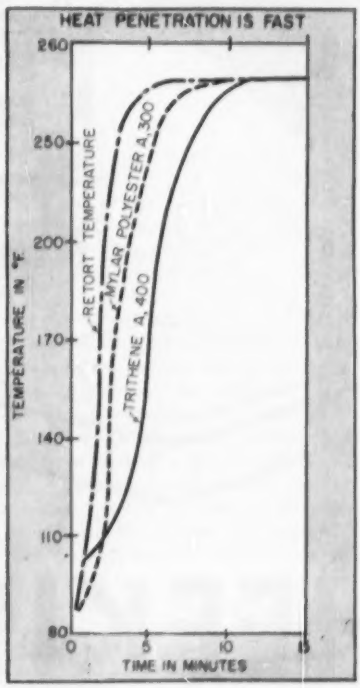
Bag Burst-Points (Seams Ruptured First)

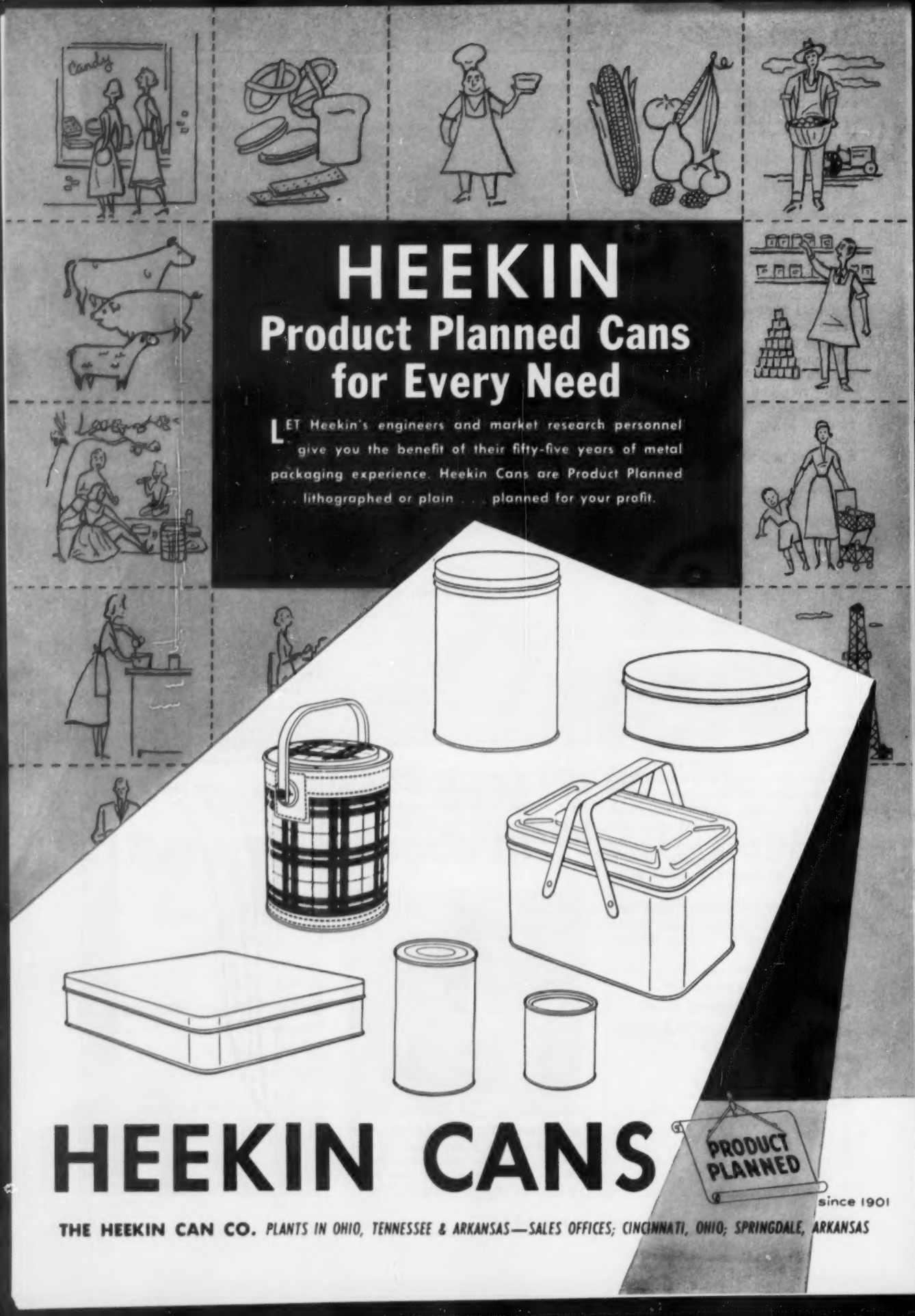
Film (6 Bags Tested for Each)	Leak-Starting Air Pressure (Mean In. H_2O)	Standard Deviation
Mylar A, 200 mils	88.4	42.3
Mylar A, 300 mils	101.6	54.2
Trithene A, 200 mils	95.5	42.4
Trithene A, 400 mils	82.6	19.6



CONTROL SYSTEM is detailed in this schematic. Temperature-sensing element is at top of heat exchanger. Air pressure detector is in pipe line between pressure control valve and retort. A thermometer is installed in discharge pipe under retort. Special fitting allows introduction of thermocouples through retort side (near top). These devices permit measurement of heat penetration into products.

STANDARD THERMOCOUPLE measures heat penetration. It's attached with nuts and rubber gaskets similar to method used with metal cans. For result, see chart, right.





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Ole pressed on with considerable emphasis: "If it were up to me," he declared, "I'd give that management prerogative clause a thorough going-over—and I do mean thorough."

Ole Sage Episode

SUPERVISOR SENIORITY TAKES DELICATE JUGGLING

—Especially when it involves union men and stirs up a re-rigging of the contract

IVAN C. MILLER
Associate Editor, "Food Engineering"

Barney Hasbrook, Industrial Relations Manager of Holstein Dairy Products Corp., was in a very pleasant mood of self-congratulation.

He and Ole Sage, consultant for the company, were coming from a meeting of foremen and supervisors where proposals for the new union contract had been discussed. And Barney was particularly happy about the way it had come off—also glad that his long-time friend Ole had attended, since the presence of this veteran brought him assurance.

"You know," enthused Barney, "at last we really got a bunch of alert fellows on the line. And they seem to be on our side for once. I guess that's because we're working to do things right."

When the two were seated back in the office he continued: "Last time we negotiated, we were on the heels of a strike deadline before we really got down to business. And you know the results—a lot of hasty decisions, followed by griping on the part of the supervisors and foremen. They had an idea that we'd never given a second thought to their views on what management should ask of the union. But this time we started early enough to get all their suggestions aired and also in time to do something about them."

Ole reached across Barney's desk and hefted the manager's heavy briefcase. "You sure do have plenty to work on," he agreed, with a meaningful glance at the bulging case. "However, while some of those ideas offered by the men made good sense, a number of the other suggestions indicated many of the boys hadn't thought things through."

Ole paused, then delved deeper: "Seems to me your last contract was sound on most clauses, and comprehensive, too—whereas if you follow out today's suggestions, the result will be almost a complete rewrite of the old contract."

"Oh no, it's not as bad as all that," assured Barney. "Almost all the proposed changes concern the seniority clause. Of course, we will have to go over that section pretty thoroughly. Most of the rest of the contract is Okay, though, and won't need any modifications."

But Ole pressed on with considerable emphasis: "If it were up to me," he declared, "I'd give that management prerogative clause a thorough going over—and I do mean thorough."

"Why," sputtered Barney, "what's the matter with that clause? There's been no change in that for years. It's never given us any trouble."

"That's just it," Ole cut in. "It hasn't given trouble because its meaning, to date, has been very clear. But certain of those changes now suggested for the seniority clause could affect that 'very clear' clause—so that it won't mean the same thing any more."

Ole emptied the ashes from his pipe, then went on: "Take that suggestion to the effect that men promoted to supervisory jobs shall accrue seniority. That might prove treacherous."

Barney chuckled. "Treacherous, you say? Why, that's the best idea we've come up with so far. You know all the difficulty we've had finding suitable people for first-line management openings. Almost never can we get the right kind of supervisors from the outside. The ones who know dairy operations don't know how to get along with the men. And those who seem to have leadership qualities don't know whether cream rises to the top or settles to the bottom."

Afraid to Take Promotion

Barney then dug out a paper from a drawer of his desk, and said: "For a long time now we've had our eye on some of the more skilled men in the plant. Here I've listed a few of them. And I think you'll agree they'd make good supervisors. But," he gestured hopelessly, "the way it is now, they're afraid to take the promotion because under

UP THE HARD WAY came Ole, our principal character in this special series of "cases" fictionized to pinpoint boss-worker problems in the 1955 food plant.

Ole began as a laborer, proved himself "a good worker" who "used his head"—thus won the respect of both workers and bosses. He later rose to foreman, then superintendent. And finally he was management's choice as "a natural" to head Industrial Relations, a job he carried out with unusual success until his retirement.

—Actually, his was a very short retirement. Because his old company, and others, too, quickly were calling on him for counsel—as related in these episodes.—*The Editors*

our present contract they'd lose seniority. As a result, if we find it necessary to curtail production they might find themselves out of a job. And as you know, our business still is pretty seasonal."

"I can well understand how they feel," agreed Ole. "I, myself wouldn't care to be in that position."

"All right, then," said Barney. "That's why they want to change the seniority clause—re-write it to state that supervisors accrue their seniority while outside the bargaining unit. In that way they'll lose nothing if it does become necessary to cut down. Now, I ask you—what's the matter with that?"

"Not a thing in the world," assured Ole. "It's a good idea. And I hope you can get the union to go along with it. *All I'm saying is that you should go over the whole contract and make sure it doesn't cramp your style in other ways.*"

Ole let that sink in for a moment, then said: "What would happen, for instance, if you wanted to fire one of those newly promoted supervisors *'for cause'?*"

"Why, we'd just fire him, of course," came back Barney. "Supervisors aren't in the bargaining unit and aren't covered by the contract. They can be hired or fired as management sees fit. And you certainly must agree that's the way it should be. Furthermore . . ."

But here Ole interrupted him: "On the contrary, that's the way it was when supervisors *didn't* have any seniority vested in the bargaining unit. But will it really be the same when they do? And suppose we look at it from the union's point of view: If you're permitted to fire supervisors at will, without accounting to the union for it or showing *just* cause, that means you can wipe out a man's seniority. In short, if work slackened off you could defeat the purpose of a seniority clause by discharging the supervisor 'for cause' instead of transferring him back into the bargaining unit in accordance with his seniority."

"Wait a minute, Ole," Barney protested. "You know we wouldn't do a thing like that. If we thought enough of a man to make him a foreman we certainly wouldn't deliberately discriminate against him."

"Oh, yes, I know that just as well as you know it. But does the *union* know it?" Ole persisted. "Besides, can you really be so sure things would work that smoothly?"

Ole Spots a Dilemma

"And another thing: What would you do if you learned one of these supervisors was using his position to coerce non-member employees into the union? Your company policy here has always been very strict. You never interfere with the right of a man either to belong to a union or to refuse to join."

"And so, here's your dilemma: If a supervisor deliberately violated company policy in this respect—no matter in which direction—then you'd have to fire him, or else get into a peck of trouble with NLRB."

Barney sucked slowly on his pipe for a while. "You know, you do have something there," he finally admitted. "I still think it's a good idea, due to the seasonal nature of our work, to encourage men to take supervisor jobs by guaranteeing their seniority. Nevertheless, its just as you say. We're going to have to go over the whole contract with our attorney and clarify this point about management's right with respect to supervisors."

"And I'll have to grant that this business of contract negotiation can be mighty tricky. You make a change one place, then it shows up somewhere else. You've convinced me. We can't take any part of the old contract for granted. What's more, changing circumstances can unhitch things even when the contract remains the same."

"You're right as rain," chuckled Ole. "That is, with the one exception of your arbitration clause, which I note is in accordance with the rules of the American Arbitration Assn. Being exactly the same clause as that written into thousands of other contracts, you won't have to re-examine that one."

From Ole's Notebook

Tabbing Workers on Trial

It happens all the time. A new employee, having completed his probationary period, goes on working well beyond it—and then his supervisor decides he didn't make the grade after all. So he is let out.

Inevitably, if there is a union, a grievance is filed, and the company has to go through the whole costly rigamarole of proving incompetence.

But had the firing taken place before the worker came into his rights as a regular employee there would have been no such trouble.

The problem arises from two causes: either the supervisor cannot make up his mind in time, or he forgets when the probationary period is up. The remedy lies in smoother procedures.

In one company, the personnel department maintains a tickler file of all probationary workers. A week before the trial employee's time is up, a reminder is sent to the supervisor.

Another organization has a more elaborate system. A member of the personnel department and the foreman meet with the new worker a week or two before his probation expires.

This gives both the foreman and personnel man an opportunity to get the worker's reactions to his job, his environment, his problems.

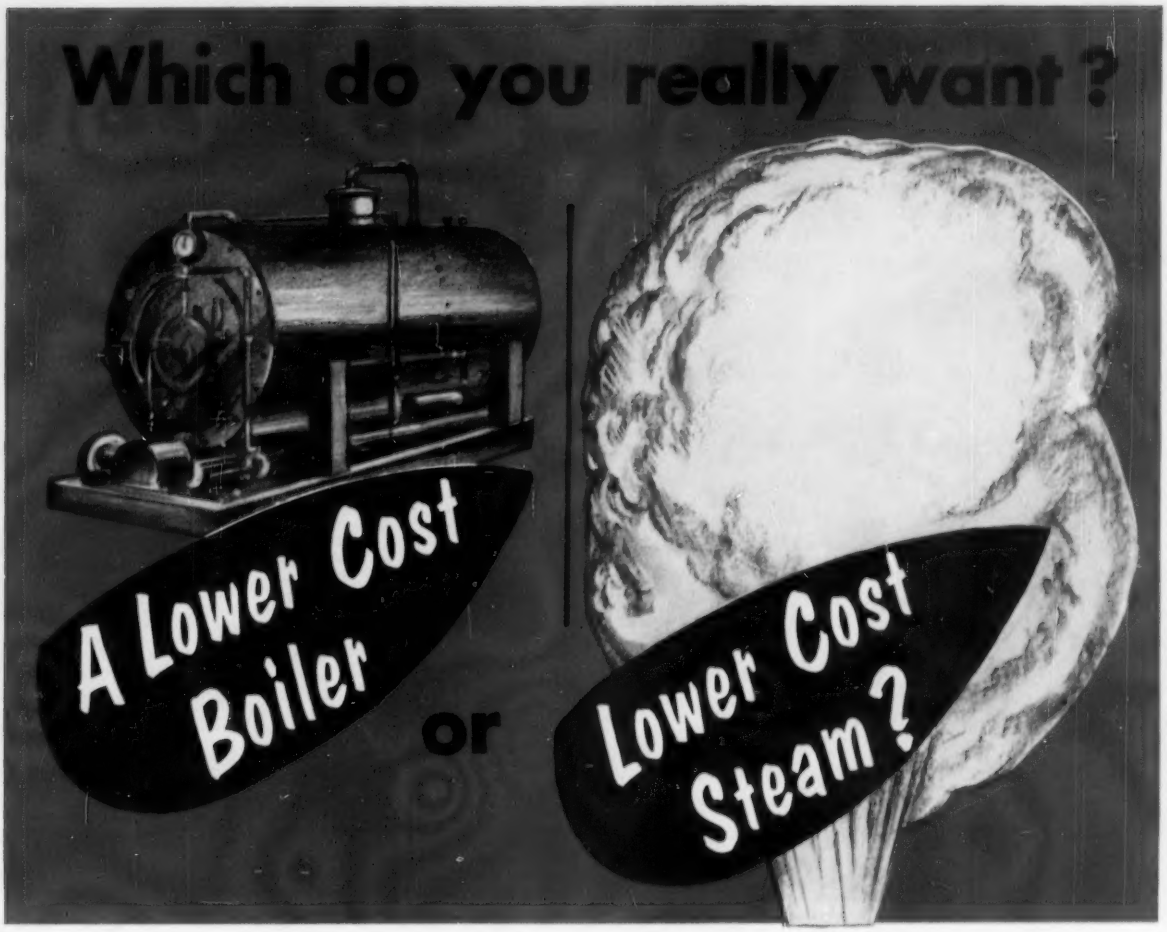
After the meeting, the foreman and the personnel man fill out a joint "New Employee Follow-Up Interview" form, covering such matters as job instruction, working conditions, job satisfaction, wage satisfaction, social adjustment, orientation on working conditions, and worker appraisals.

Thus, when a decision is made that a newcomer be kept on, it is no haphazard matter.—*"The Management Review"*

Pays to be Firm

When necessary, management should be firm. Most unions have far more respect for a company that gets all the pertinent information, analyzes it, and says, when the time comes:

(Turn to page 99)



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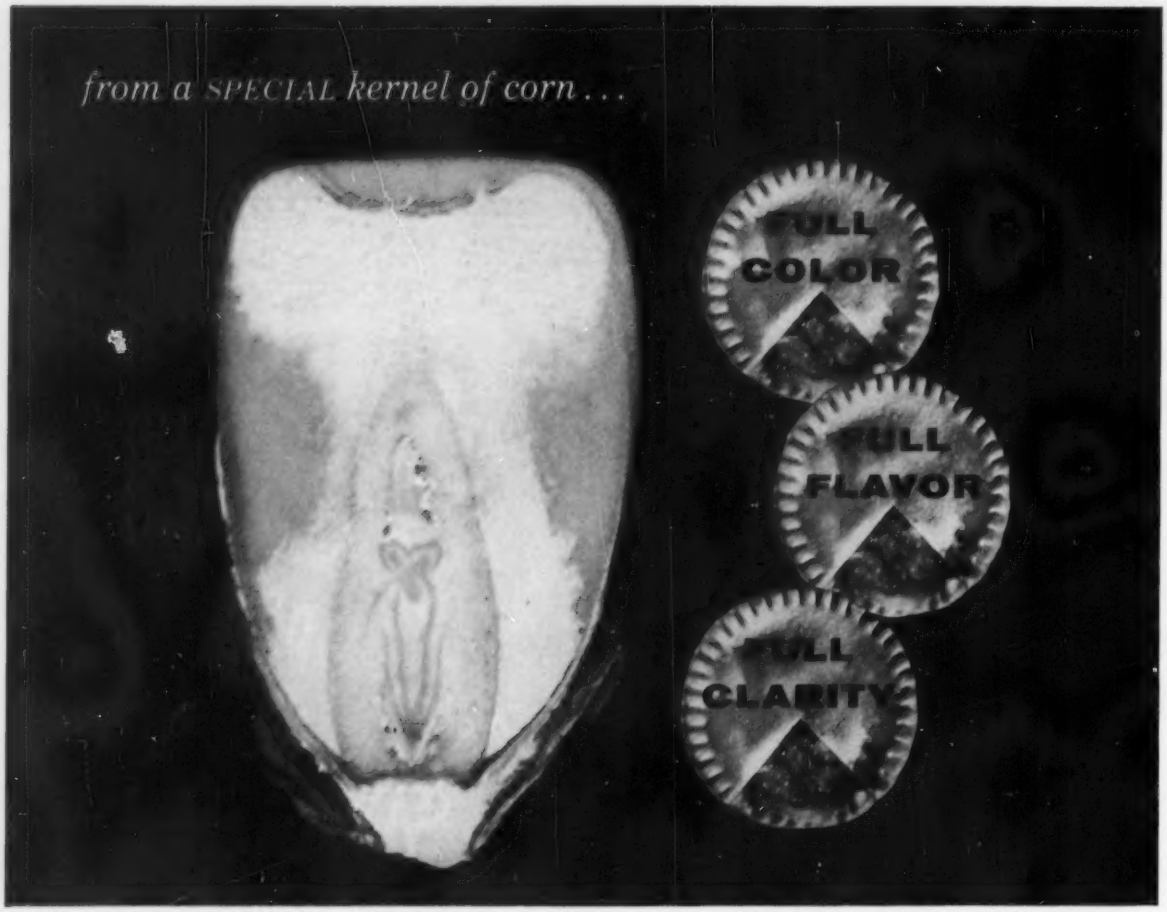

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Ole Sage Notebook

—Continued from page 96

"Based on all the facts, this, gentlemen, is the best we can do."

Until management reaches the point where the union knows that it means just exactly what it says, the union cannot be blamed for making "one more fight," and then another and another.

In short, if management vacillates, then immature, rough treatment can logically be expected.—*Herbert O. Eby, Labor Relations Director, Pittsburgh Plate Glass Co., in talk before California Personnel Management Assn.*

Paying for Suggestions

Experience with suggestion systems indicates that the more generous the awards, the more effective the program and the greater the savings in the long run.

Cash awards nearly always are best. A minimum amount should be established, $5 or $10 being common. Awards probably should never be less.

There should be no maximum award. A maximum has no particular purpose, and it is good psychology to have "the sky" as the limit.

Wherever possible, awards should be based on the net savings expected from using the idea for the next year. The net saving is the gross saving less the costs of applying the suggestion. These costs include retooling, redesigning, and the scrapping of superseded parts, equipment, printed forms, or what not.

Be moderate in appraising stepped-up obsolescence resulting from new ideas; that should be a welcome price to pay for increased efficiency. Where you can't measure savings, make a reasonable estimate.

Since awards will be based on actual savings to the company, it pays to give reasonably big awards. Experience shows that a big award is followed by increased interest in the plan and an increased volume of suggestions.

Some companies award the suggester 10% of the estimated first year net savings. Other give more—sometimes as much as 50%, or up to 25% of the first 3 years' anticipated savings. Some companies pay on a sliding-scale basis, with the percentage decreasing as the saving gets very large.

One leading manufacturer goes even further, giving the worker his choice between 50% of the net savings for the next year and the right to see what he can do with his own idea on his own job. He then gets a generous award based directly on the increase in his output resulting from use of his idea. This is a powerful spur to improved methods and greater efficiency.

In selecting a method for determining the amounts to be paid as awards, remember that the awards are not a matter of generosity but of stimulating the employees to think constructively about the business and to bring about genuine improvements and economics. Unless a suggestion actually will result in an improvement or savings, it is questionable whether an award should be given.—*"An Employer Suggestion System for the Small Plant", U. S. Government Printing Office, Washington, D. C.*

One View of the Big Union

"There is no special virtue or lack of virtue inherent in one big labor union which would not also attach to one big business, one big educational organization, one big political party, or one big sectarian theology.

"With bigness comes a concentration of power, and with that power comes abuse.

"There has been no exception to that rule throughout the known history of man."—*George Q. Lynch, President, Pattern Makers League of North America (AFL) in "Personnel Journal."*

Favor Single Arbitrator

When the American Arbitration Assn. asked management, "Do you prefer three-man or one-man arbitration boards?", 79% favored the latter.

Reasons: Selecting three men takes excessive time, and delays in the final decisions are likely.

Executives further replied that three-man decisions too often were compromises not representing the stand of any specific individual on the board.

"Nice to be the Boss"

"It's true that management responsibilities are great—but management is paid accordingly. Never have I known of a top management man whose burdens became so great that he swapped places with the worker.

"All too often those in management who feel most sorry for themselves are down to their third Cadillac and second cruiser. So let's stop kidding ourselves and cut out the double-talk.

"Even with all his headaches, it's still nice to be the boss."—*Saul M. Silverstein, President, Rogers Corp., in talk before American Management Assn.'s Office Management Conference.*

Toward Better Handling Of Discipline Cases

Acting for a disciplined employee, the union can appeal the case first to the foreman and then on up to top management.

Whereupon, if management and union fail to reach a settlement, a decision may be reached by arbitration (as provided in most contracts).

Certainly this is better than not reaching a settlement. Further, decisions of arbitrators are coming to form a useful framework for both management and unions to use in decision making.

But as this method of procedure is usually applied, it has some grave defects.

The machinery begins operating only after management has made its initial decision. It is, in other words, only a system of appeal. The initial act of discipline by management is still arbitrary and unilateral. Any later determination that modifies or revokes the punishment is, in the eyes of employees, conclusive proof that management was unjust.

Because the union is given the role only after an appeal has been filed, management often makes its decision without consideration of the case for the defense. Only when the appeal is filed does the union present its witnesses and its reasoning. Frequently the union's case is convincing, and management is out on a limb wishing it had known *all* the facts sooner.

It certainly would be well for management to approach discipline with these considerations in mind. Why not make the investigation first? Why not solicit evidence and information from other employees?

■ **There is an old belief that a good foreman must make a decision quickly—that in cases of discipline he must act on the spot at the instance he observes or learns of the offense. But this is nonsense, especially when the apparent offense calls for major discipline.**

The foreman should act, to be sure, just as a policeman makes an arrest. But just as a policeman does not try a case and sentence a malefactor on the spot, neither should the foreman.

If it seems necessary, he should send the offender home while the case is investigated. The disciplinary decision can be made next day, or the day after.

Often it will help to hold an informal hearing with the employee and his union steward, together with any witnesses they summon.—*Human Relations in Small Industry, McGraw-Hill Book Co.*

End *(Resume reading on page 100)*

In Behalf of Progress . . .

Technical Opportunities Challenge You in 1956

If you rise to the challenge of opportunity, and all successful men do, 1956 can be your most exciting year yet in food manufacturing.

We pointed up the challenge of prosperity—the readiness of dollars in the marketplace—last month. But there are equally important, and even more intriguing, technical opportunities.

One of these may turn out to be the most significant innovation in food preservation since the advent of quick freezing. We refer to the addition of an antibiotic to the list of means for inhibiting food spoilage organisms.

It is approved for use with eviscerated poultry, the cooking of which destroys the Aureomycin chlortetracycline. This "breaks the ice" for a revolutionary new technique which has intrigued the industry for three or four years.

Although approved as a "pesticide," with a federally established tolerance, this particular antibiotic looks like a "natural" for fresh fish and red meats.

It may well prove practical as a solution to bacterial deterioration of frozen foods during defrosting—provided, of course, the frozen items must be cooked before eating.

Not much stretch of the imagination is needed to visualize benefits from treating fresh vegetables and fruits with the new spoilage inhibitor. And when technologists really turn on their imagineering, they dream of Moby Dick and the eventuality of preserving whale meat so as to open up a new source of food for the world.

Canners will look longingly at this new entry in the food preservation field, but with the knowledge that they can't use it to permit less rigorous heat processing—not now, anyway.

In terms of world food problems, the antibiotic becomes even more significant than it is in this country. Think what it might do to protect meat in warm countries with little or no refrigeration.

But this new method for keeping food fresh longer is but one of the technical challenges. Nuclear and electronic irradiation still pose the promise of commercial fruition for preserving food products, killing insects, preventing sprouting, breaking the trichnosis cycle, and making difficult automation achievements possible.

There are many scientific and engineering problems to be solved. But a lot of research is being done on these problems. Keep your eye on this one.

Not so dramatic, but nevertheless a technical challenge of large dimension, is the scientific application of chelating, or sequestering agents, to improve food quality, extend shelf-life, and solve processing problems. These highly selective compounds have the ability to tie-up troublesome metallic ions and prevent their usual deteriorating reactions—or to remove them to improve quality, as in tenderizing canned peas.

One class of chelating agent, the polyphosphates, now is used for several purposes, with official approval. The organic type, such as EDTA (ethylene diamine tetracetic acid) also will do many technical tricks—like inhibiting precipitation, clarifying wine, controlling wildness of beer, and preventing discoloration of pre-peeled potatoes. These organic chelaters are not entirely in the official clear, although there is much evidence that EDTA is safe at levels below 100 ppm.

But don't let the new scientific "tools" take your attention from the challenge of advanced engineering. This presents cost-cutting and quality-improving opportunities at every turn in food manufacturing. Continuous processing, short-time high-temperature treatment, and aseptic canning can, and will, go a lot further.

Electrostatic smoking is panning out as a successful meat treatment. But the technique is more than that. It is a new way to perform the unit operation of coating, used in many branches of the industry.

Many other unit operations have been improved, too. But the greatest engineering challenge of the day is to put more automation to work in food plants. Not only is this needed for efficiency and quality, but to meet the shortage of labor that is expected to develop in the years ahead.

Here, let us toss in a challenge made by an engineer at the meat convention. It is to punch each product formula and process on cards, and feed these cards into an electronic robot that directs the manufacturing operations.

You may not want to do this tomorrow. But it could be done. And it indicates the magnitude of the automation challenge.

There is no let-up in the challenge to improve packages and products.

"Prefabrication" and prepackaging of products for self-service is going much further. Evidence of this is seen in the current flurry of activity in packaged and wax-coated frozen meat cuts.

So, too, is there much room for more achievement in the production of packaged, controlled-portion items—not only for the housewife but for institutions.

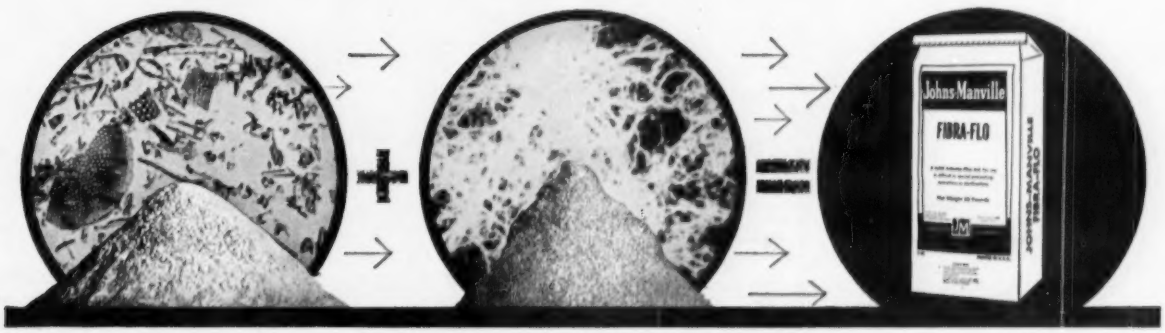
And no one need be reminded of the demand for more convenience foods of all types—the ready-to-heat-and-eat, or mix-and-bake. This challenge is only beginning to be met. Our industry will not have done its job until housewives buy most of their meals as packaged ready-to-serve items.

Yes, 1956 can be quite a year for you.

Johns-Manville announces a new line of Filter Aids

FIBRA-FLO

For . . . *Exceptional Clarity, Cake Stability, Labor and Maintenance Savings*



DIATOMITE—Celite's unique particles provide highest clarity at fastest flow rates.

ASBESTOS—Fibrous asbestos particles provide greater cake stability and adsorption.

FIBRA-FLO—In Fibra-Flo you get the advantages of both asbestos and diatomite.

Combining the excellent adsorption properties of selected and processed asbestos fibres with the high flow rates of Celite* diatomite, Johns-Manville offers this PRE-MIXED filter aid to those requiring superior filtration of liquids.

Johns-Manville, the world's largest producer of both Asbestos AND Diatomite, selects materials from each of its mines and carefully blends them into a number of grades. In addition, strict uniformity is maintained for each grade so that you may choose the exact mixture you require, relying on this uniformity for all future orders.

Fibra-Flo is now available in carload quantities. Use the coupon below to get further information.

FIBRA-FLO offers the following advantages to your filtration process:

1. Improved clarity more quickly obtained.—Increased production.
2. Filter cake more easily parted from screen.—Labor savings.
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☐ Please send further information on Fibra-Flo
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I am interested in the filtering of _____

_____ with the following equipment

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Name _____ Title _____

Company _____ Address _____

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TURN PAGE FOR FOLDOUT FLOWSHEET →

Versatile Tomato Juice Line

Six evaporation units and equal number of diversion points enable preparation and canning of products ranging from 6 to 30+% solids

At Thornton Canning Co., Thornton, Calif., top efficiency begins with raw-material receiving. Tomatoes arrive at the plant on pallets which are handled by fork trucks.

Automatic lug-box and pallet dumpers empty the fruit onto washer-feed conveyors–Point (1) in accompanying foldout flowsheet–then discharge the empty lugs, which go by overhead conveyors to steam-cleaners, then on to storage. Latter area is remote from receiving docks.

Flow of tomato products is made more complex by the six evaporators and their operation. In this all-stainless steel enclosed system, product flow may be charged at a number of points. Each evaporator is used to prepare a product of different gravity, a necessary flexibility in Thornton's operation. Gravity required and other considerations, dictate use of specific units, and product flow is then regulated by valves.

As an example, product may be valved from the preheaters (Point 2) to the flash-break heat exchangers (3).

For the story behind this Flowsheet, see p. 74.

Or it may bypass the latter and proceed by gravity through the pulper-finishers, then be pumped to the pre-evaporators (Point 4) and to the double-effect evaporators.

Preheaters, flash-break system, and flash pre-evaporators are shell-and-tube units. The latter two, however, perform some pre-evaporation prior to flow of product to the double-effect units. Flash-break system and preheaters sterilize the product and, under automatic temperature control, extract required amounts to pectin and color. They also make the pulper-finisher operations more effective.

Evaporator equipment, which has more than 6,000 sq. ft. of usable surface, is automated by over 100 control instruments, all working progressively. Steam pressure and volume is constant.

Finished juice flows to the divided supply tank that feeds first effects of the two Buflovak double-effect evaporators (5). At the required density (regulated by liquid level controls) it is drawn into the second effects. Discharge from here is also automatically controlled; density being attained by maintaining proper product level.

Product is then pumped to an after-heater (7) from which it can be valved to a filler or transferred to one of the high-density evaporators.

There are three of these units–two Mojonnier (Point 8), and one Thermovac (Point 9). One of the former was modified by Thornton for recirculation. The other is a single-pass type.

The Thermovac (also single-pass) is a 4-stage unit requiring steam at 9,700 lb./hr. It is instrument-automated as are the other evaporation units. Only two operators are necessary for the entire department. Rate of flow is regulated by manual setting on the control panel.

Intermediate pumps (Point 10), in turn, transfer product to progressive stages and are automatically controlled by the change in volume of evaporated water. And these, in turn, maintain a uniform head in sight glasses, which provide a visual check of level and product color.

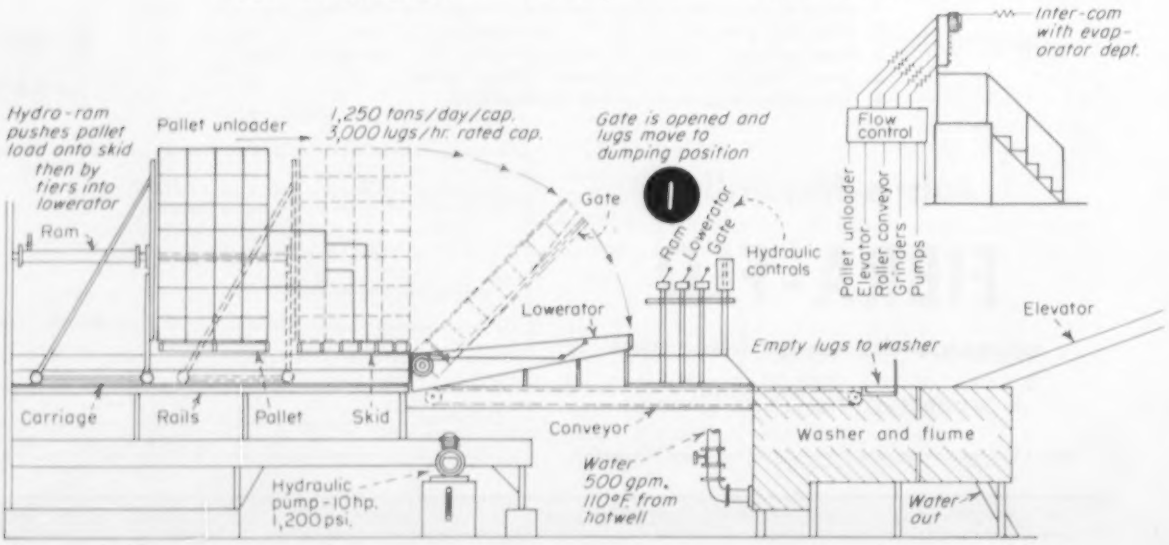
Because of the greater resistance to flow, and greater adhesion of product, positive-action pumps were modified for efficient provision of proper product velocities.

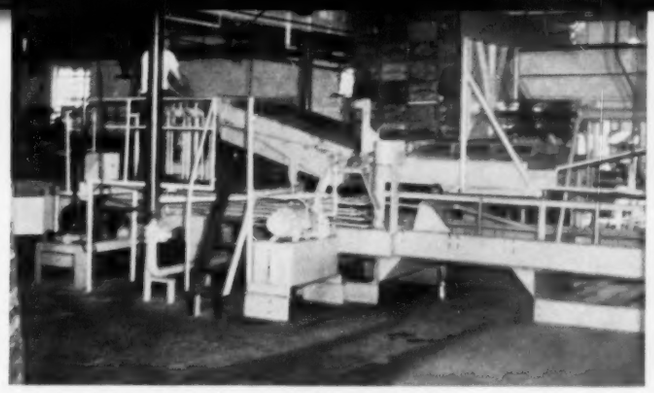
The velocities in this system are maintained in balance, and they fall within the range of the least fouling factor permissible for high density products.

CHECKLIST OF EQUIPMENT

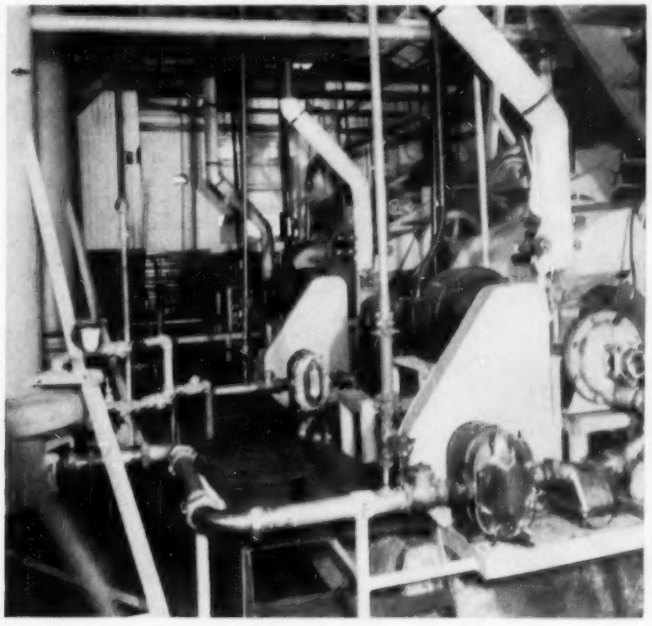
Pallet unloader, hydraulic pump, and rams, *Benner & Newman;* washer, inspection conveyor, grinders, pulpers, finishers, *FMC;* magnetic traps, *Columbia Eng.;* preheater, *O'Donnel Brass W'ks;* flash-break heat exchanger, pre-evaporator, *Oscar Krenz;* juice pumps, *Granberg;* double-effect evaporators, afterheater, *Buflovak;* high-density system, *Mojonnier;* Thermovac, *F. Bellato;* circulation and discharge pumps, *Waukesha;* variable-speed drives, *Reeves;* automatic controls, *Taylor;* stainless piping and valves, *Tri-Clover;* boilers, *Babcock & Wilcox;* steam valves, *Lunkenheimer.*

FOOD ENGINEERING January 1956 Pages 102-105



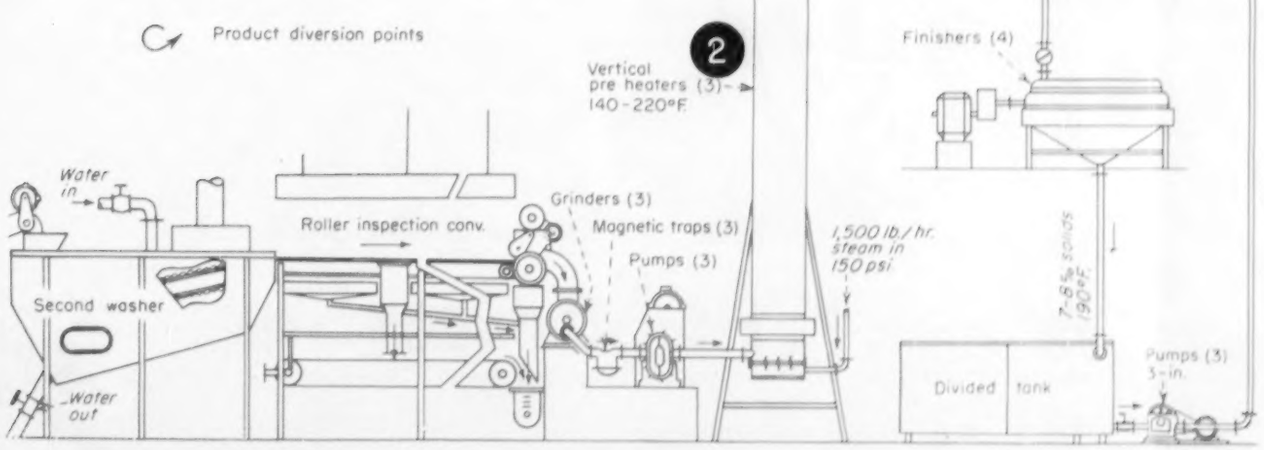


1 **PALLET DUMPER** is hydraulically operated. Requires only one man per shift to handle 1,500 tons of tomatoes (50-lb. lugs) per day.

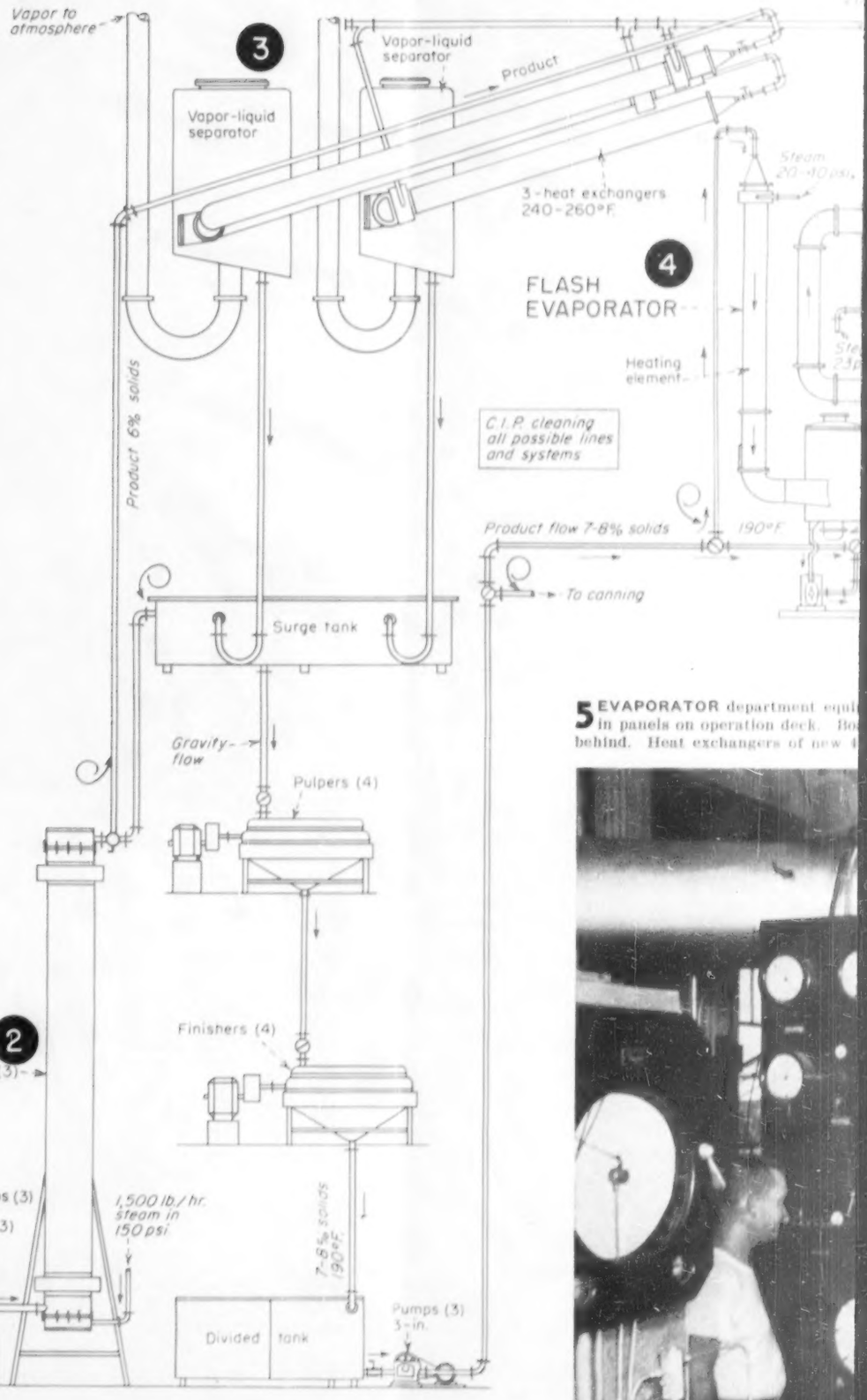


2 **SERIES** of grinders (right) macerate graded tomatoes, discharge juice through magnetic traps to pumps that feed preheaters (left).

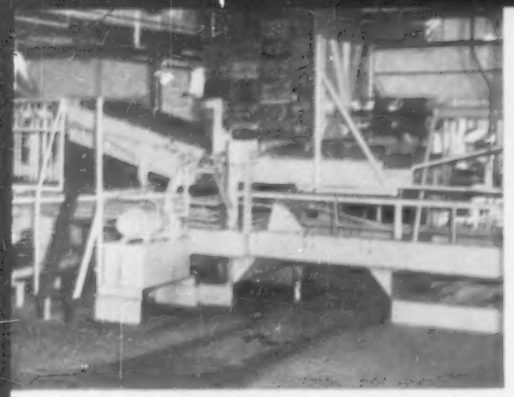
FE PICTURE FLOWSHEET NO. 84



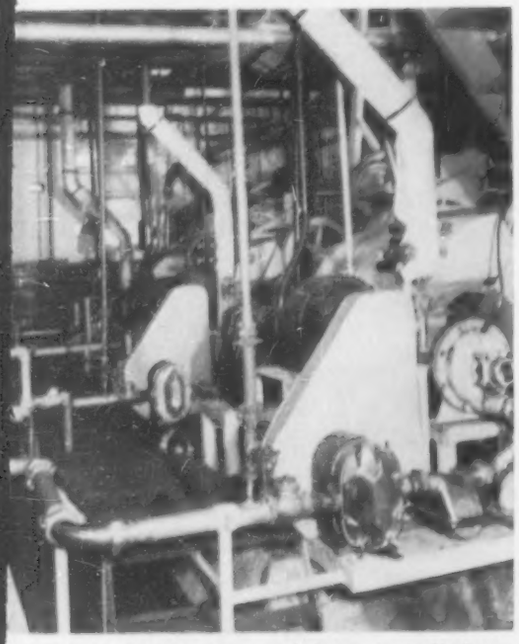
FLASH-BREAK HEAT EXCHANGER SYSTEMS (3)



5 **EVAPORATOR** department equi in panels on operation deck. Bo behind. Heat exchangers of new

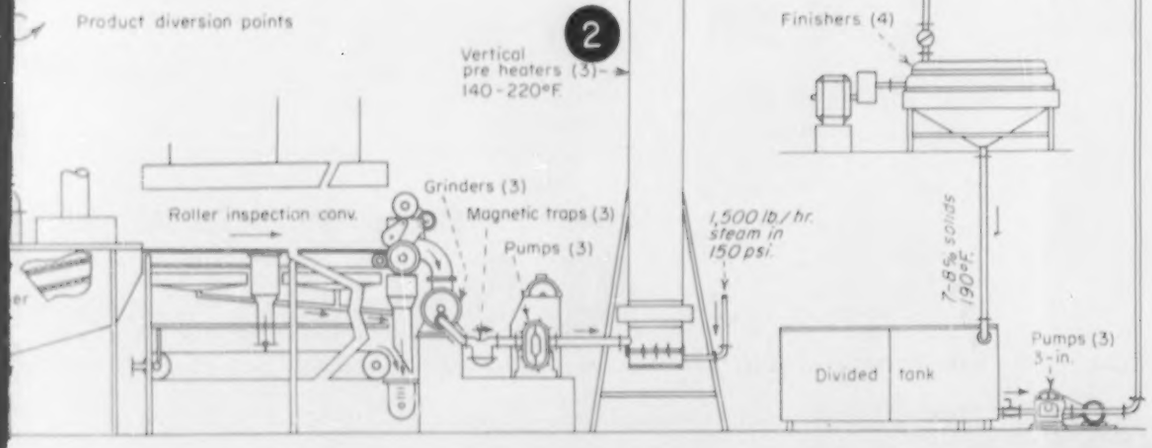


MPER is hydraulically operated. Requires only one to handle 1,500 tons of tomatoes (50-lb. lugs) per day.

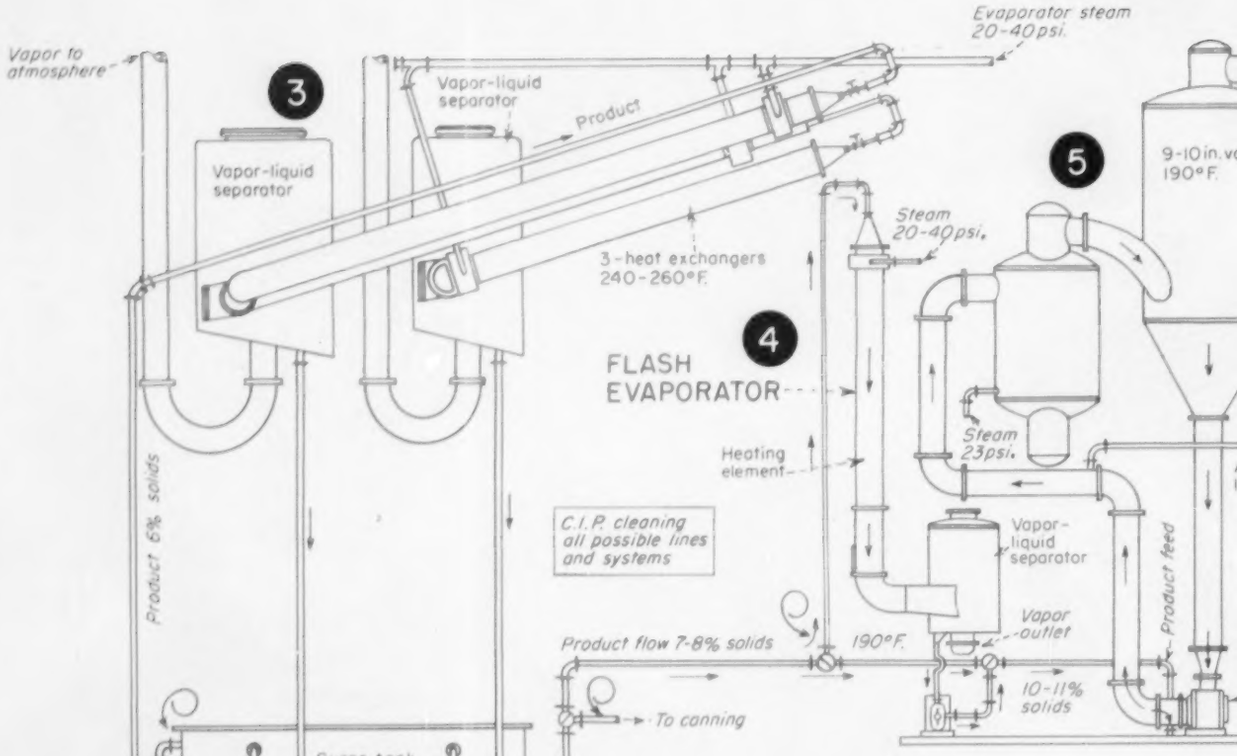


grinders (right) macerate graded tomatoes, discharge magnetic traps to pumps that feed preheaters (left).

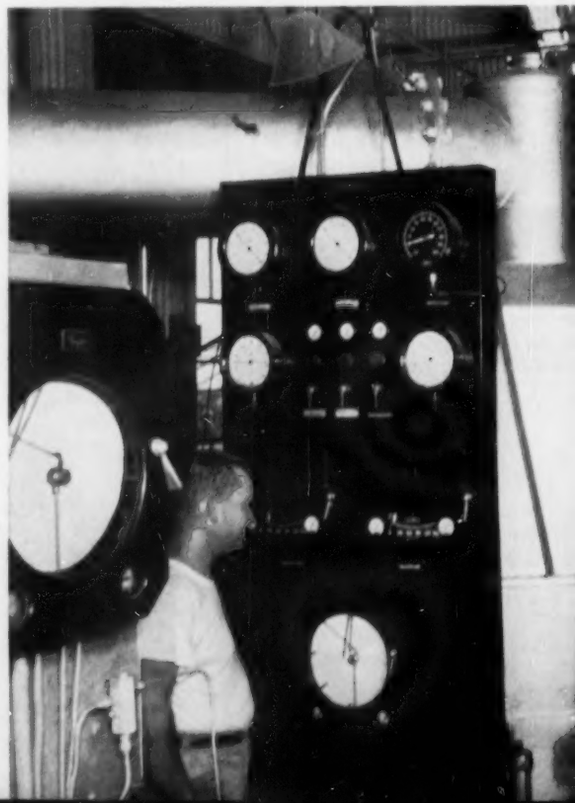
FE PICTURE FLOWSHEET NO. 84



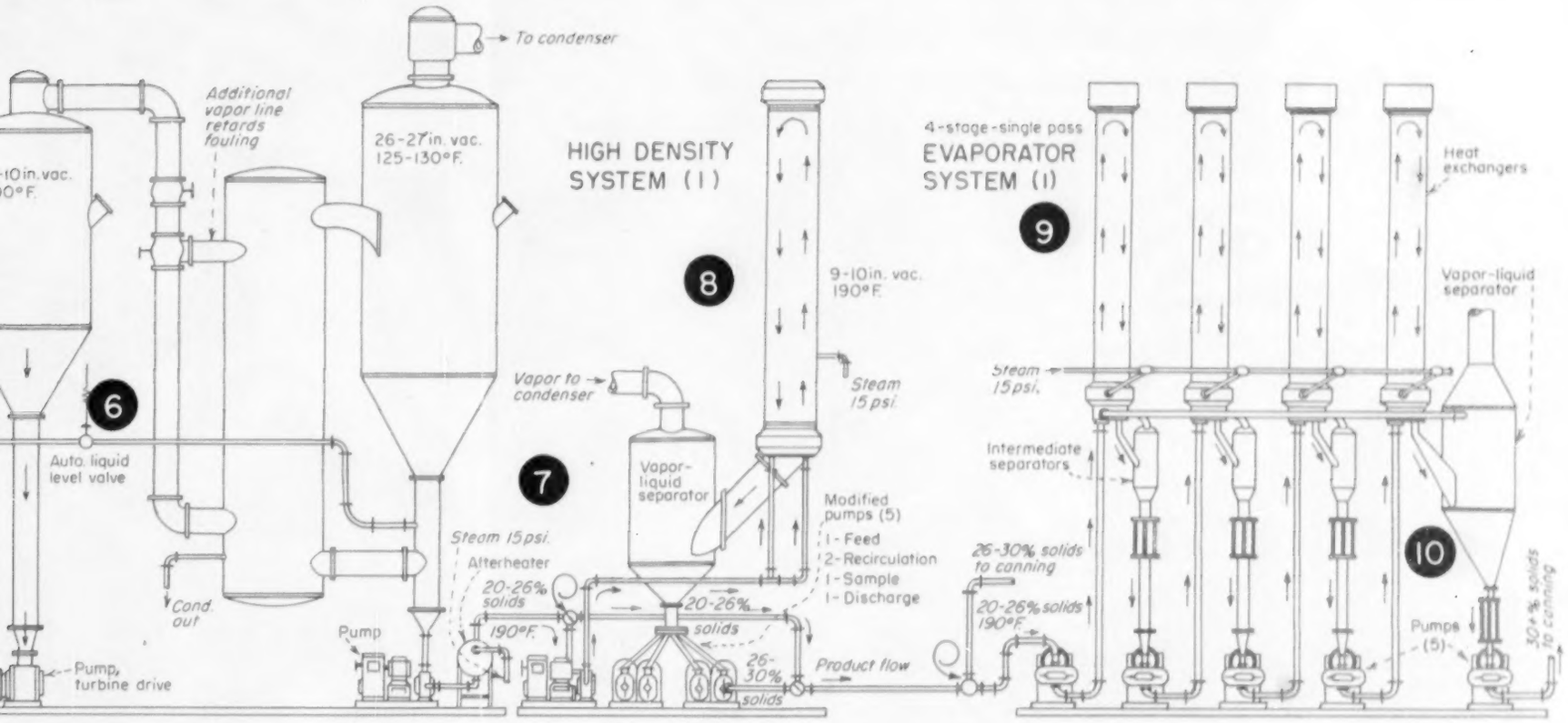
FLASH-BREAK HEAT EXCHANGER SYSTEMS (3)



5 EVAPORATOR department equipment is automated by mor in panels on operation deck. Board shown contains control behind. Heat exchangers of new 4-stage evaporator are seen



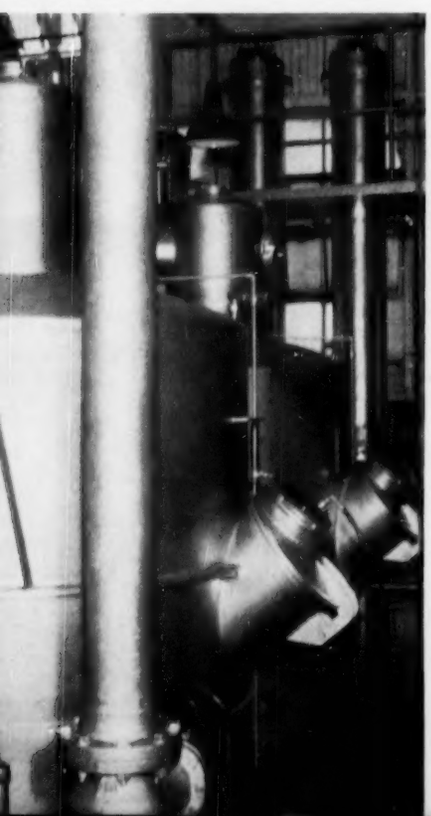
DOUBLE-EFFECT EVAPORATORS (2)

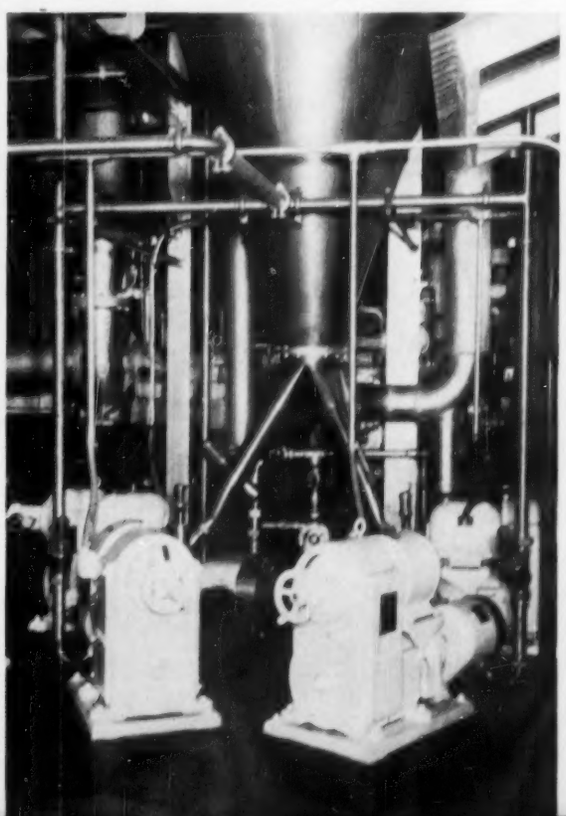


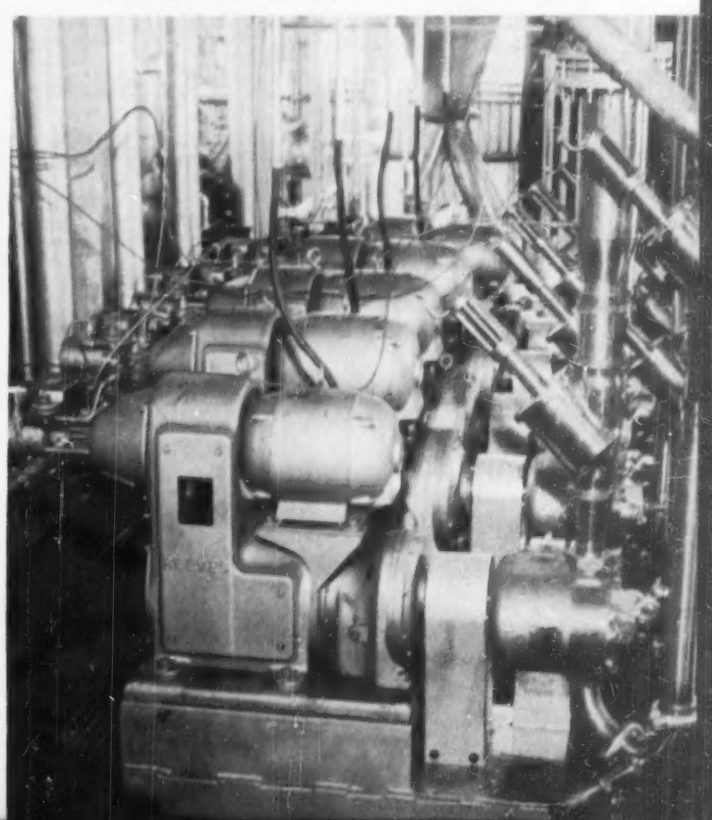
by more than 100 control instruments mounted controls for double-effect evaporator, directly e seen in background.

8 HIGH-DENSITY evaporator was modified by addition of three discharge lines and three pumps that raised velocity. It now operates six days without fouling.

10 AUTOMATIC CONTROLS (left) are on variable speed drives attached to positive action pumps. Latter remove products from new evaporator, insuring proper velocities in each stage.

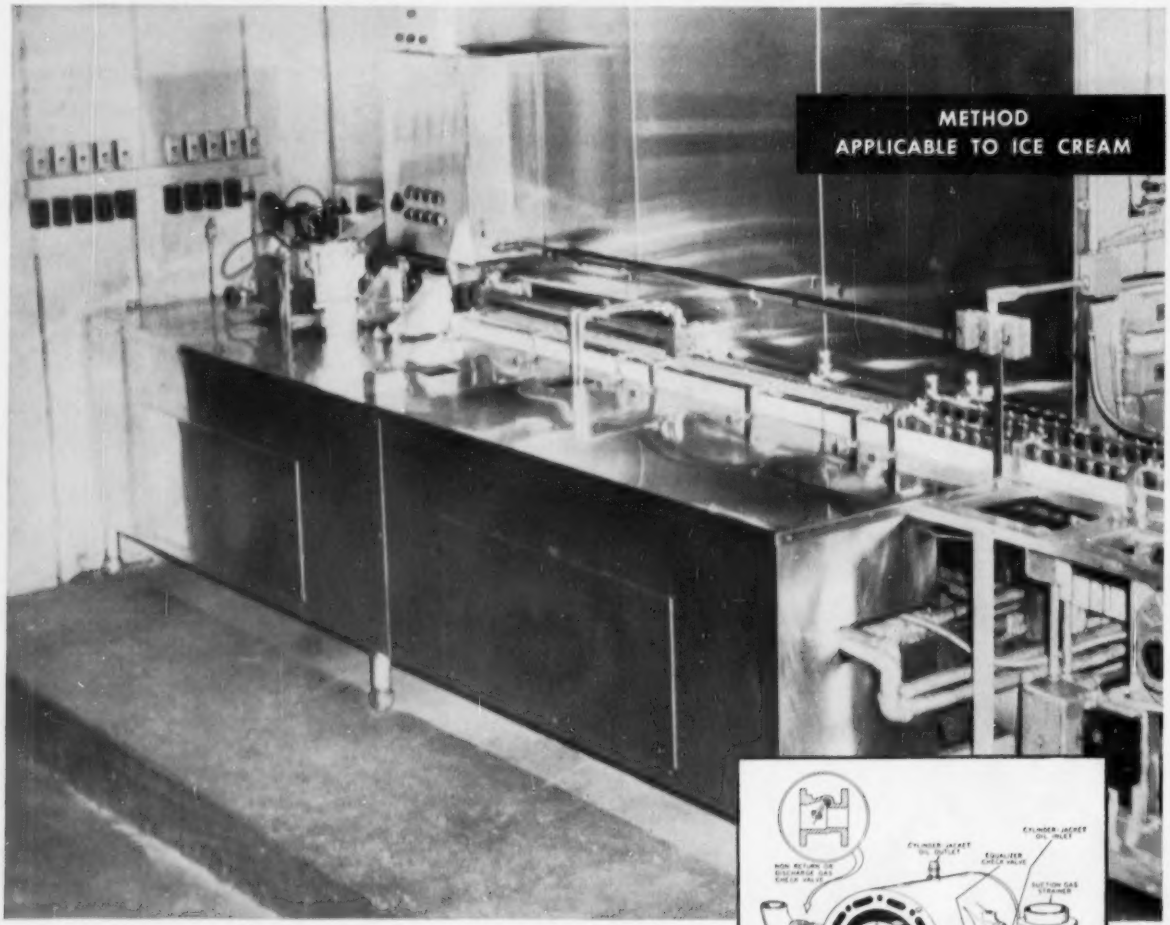




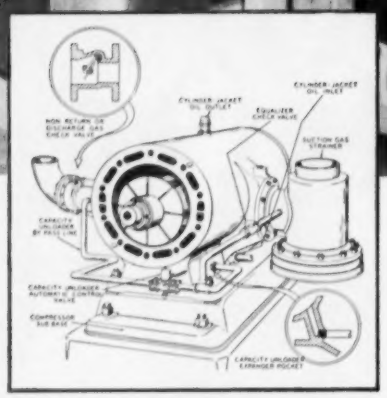


Continuous Freezing of Retail Cartons at Rate of 180 per Minute Requires Only One Operator

at Fairmont Canning Company, Winnebago, Minn.



Frozen food packages entering the Freezing Equipment Sales continuous freezer from high-speed filler. Compact insulated room freezes 24,690 12-oz. packages at one time. Only the product enters and leaves the room.



Fairmont Canning Company selected F E S -Fuller Rotaries to provide a flexible two stage refrigeration system capable of matching a variable refrigeration load. Fairmont's battery of Plate Frosters, loose product Belt Freezer and continuous Package Freezer are served by F E S -Fuller Rotaries under varying refrigeration requirements from 3" to 10" Hg. Vacuum.

1975
C-280

Compactness and simplicity of design make F E S-Fuller Rotary the most popular refrigeration booster. Rotary principle of gas compression insures high efficiency at large gas volumes to give compact and light weight machine generally smaller than the driving motor. Absence of suction and discharge valves, connecting rods and crankshaft give a simplicity in design which guarantees low maintenance cost and quick overhaul if any plant shutdown is necessary.

Whatever *your* refrigeration requirements, turn to service-proved F E S-Fuller Rotary Booster.

Write for more information.

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FREEZING EQUIPMENT SALES, INC., 423 WEST MARKET ST., YORK, PENNA.

Qualified distributors in principal cities

LOW TEMPERATURE FREEZING EQUIPMENT

These Crane valves stay tight on soap oils and fatty acids

THE CASE HISTORY—Leakage through valve seats in raw materials supply lines posed a serious problem for Davies-Young Soap Co., Dayton—makers of various type soaps and cleaning fluids. Unwanted materials leaking past metering stations would infiltrate processing vats.

Four different makes of valves were tried before these Crane valves were installed. With all four, results were the same—seat leakage developed quickly; the valves lasted no more than 4 to 8 weeks.

Valve replacement costs were a factor on top of production losses.

The condition was remedied on installation of Crane No. 1670 Ni-Resist cast iron valves in January 1954. Eighteen months later—with no piping maintenance and no shutdowns whatsoever—the Crane valves are still holding tight. And they show no deteriorating effects from the fluids handled.

Crane Ni-Resist gates don't *look* much different from similar valves of other makes. Their difference is in properly designed, accurately finished seating of 18-8 SMo stainless steel—plus the *extra* erosion-corrosion resistance of Ni-Resist bodies and bonnets cast by Crane. Thrifty buyers know these valves have no "equal" for handling many hard-to-hold, mildly corrosive fluids.

You should have the new folder (AD2047) on these valves. Ask your local Crane Representative for a copy, or write to address below.

CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Dollars of ***FIRST COST*** *aren't so big...*
if they're the ***LAST COST***

AL STAINLESS STEEL
in various industries

Booklets currently available on the principal uses and methods of handling AL Stainless in the Dairy, Meat and Brewing industries (also Paper, Petroleum, Chemical, Textile, Laundry and Hospital fields). Others in preparation. Write for a copy in the field(s) in which you're interested.

ADDRESS DEPT. FE-73

First cost isn't everything! What really counts in most cases is not how much a thing costs when new, but how long it lasts; how *little* it actually costs when reckoned in terms of extra years of service.

That is where AL Stainless jumps to the head of the class. Stainless steel is a package of built-in advantages you just can't match anywhere else. No other commercial material is at once as hard, strong and lastingly beautiful—as resistant to heat, wear and corrosion—as easy and inexpensive to clean and maintain.

To top it off, AL Stainless is easy to fabricate, and we produce it in every shape or form a fabricator may require. Check up on its money-making possibilities for *you*, either in your products or your equipment, *and let us help!* ● ***Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.***

WGW 5483 F

Make it BETTER-and LONGER LASTING-with

AL Stainless Steel

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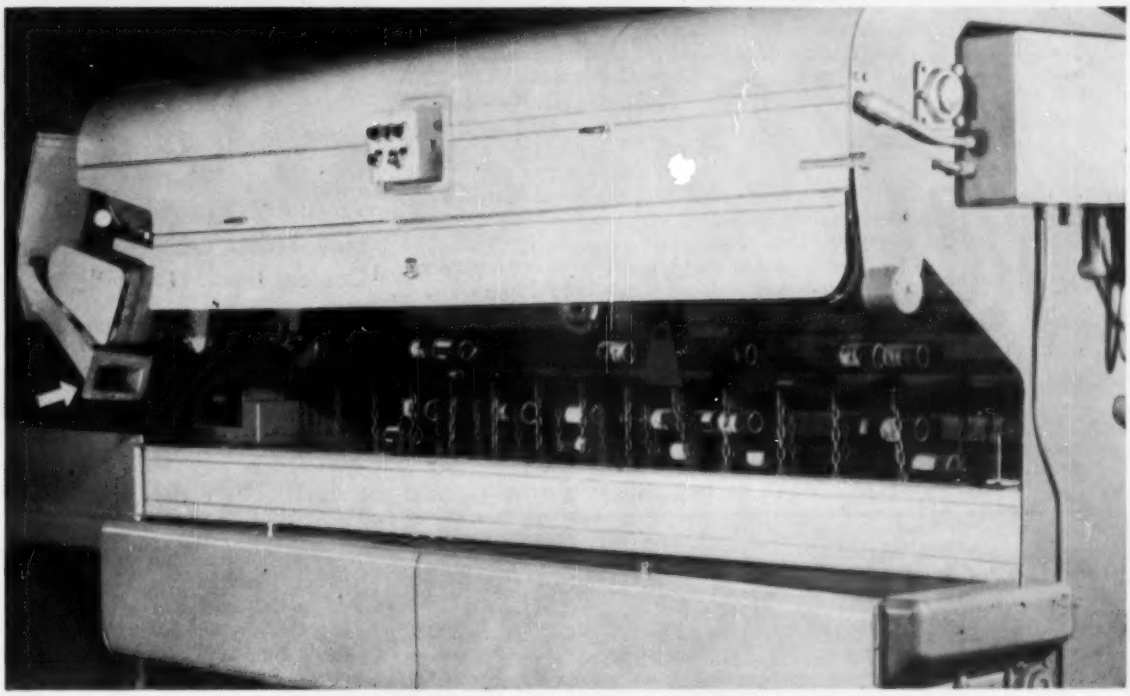
NEW EQUIPMENT & SUPPLIES



Automatically Uncases, Sorts New Cans at 550/Min.

Wide food-industry application is seen for a new machine designed to eliminate tedious and costly manual handling in uncasing and sorting of new food and beverage cans.

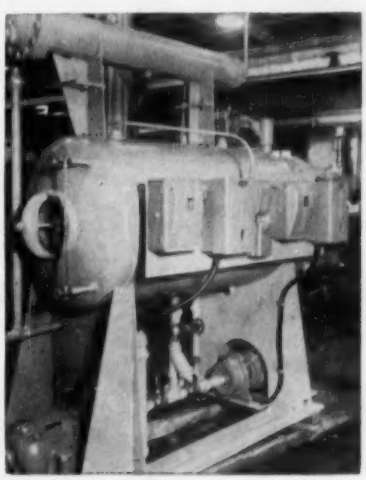
Since tins from can manufacturers come labeled, sealed on one end, and packaged in fastened cartons, this unit (Can Uncaser-Sorter) can replace a team of four or five workers by—

Unpacking cans from cases, then arranging them with open ends aligned in single-file for filling—automatically and at 550 per min.

In operation, incoming cartons of cans are fed upside-down into an uncaser (which adjoins the sorter shown above) with carton flaps resting on unit's conveyor belt. As cartons enter the uncaser, a plow opens their side flaps and folds them back, leaving end flaps still supported by the belt. Latter ends after depositing cartons on an open frame which supports only the carton edge.

Unsupported end flaps are pushed downward by weight of cans which empty into a bin (below arrow). Empty cartons are reinverted by a drum and carried by conveyor to the packaging room for loading with filled cans.

Empty cans, lying scrambled in the bin, are removed by a conveyor belt which carries them past a series of rubber paddles sweeping back and forth across the belt. These sweep the cans into channel-like pockets of an elevator belt which carries them up into the sorter. Inside the sorter, cans are assembled in single file and deposited on another belt that takes them to the sorting mechanism. Up to this point, cans are arranged end to end, but are intermixed as to position of open and sealed ends.



Then a magnetic pulley, operating with an air blast, whips cans into properly aligned position, with open ends facing the same way. Aligned cans are next passed through a chute (arrow) and deposited on a main conveyor (not shown). Here, they are turned upright and delivered to filling machines.—*Radio Corp. of America, 30 Rockefeller Plaza, New York City 20.*

Circle 109A on Reader Service Card

Packaged Unit Recovers Steam-Condensate Heat

To cut steam costs, this new packaged boiler-return system recovers heat from high-pressure condensate to preheat incoming water for processing. It also reheats condensate, plus make-up water, to near steaming temperature and returns it to the boiler.

Called p-k, unit comprises a condensate cooler and receiver, feedwater heaters, controls, pumps, piping and accessories. It is ready to be set up and piped to steam, condensate, and water lines. The condensate cooler is an integral part of the receiver, which mounts the closed boiler-feedwater heater. Accessories—steam trap,

strainers, gage, check and quick-vent valves, thermometers, and pressure gage—are furnished assembled.

In operation, high-pressure condensate enters the cooler through a connection on the extending nozzle, and after being cooled below the flash point, discharges directly to the insider of the receiver. Incoming water circulates through the cooler, is preheated, then piped to the hot-water storage heater. Hot condensate from the receiving tank is pumped to the feedwater heater, where it is heated to near steaming temperature before being returned to the boiler as feed.

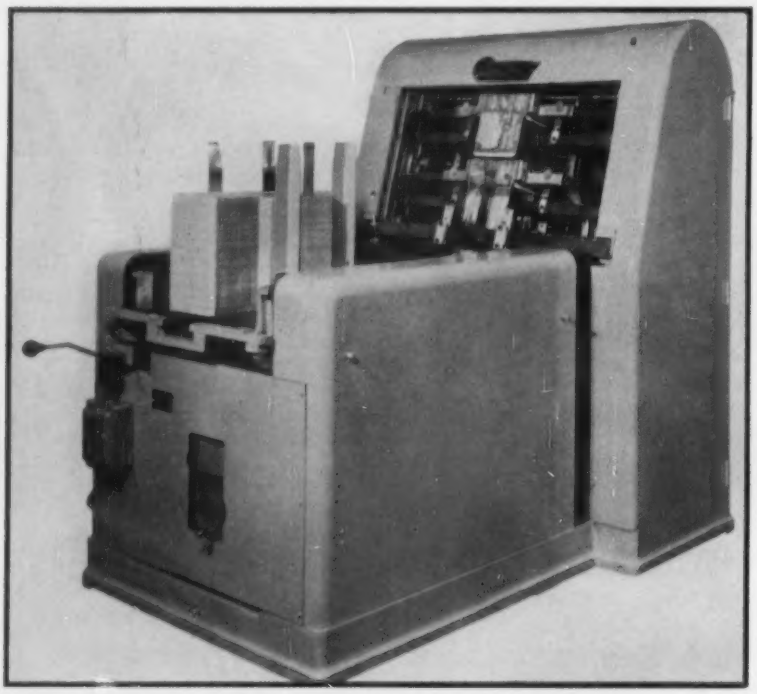
The condensate cooler is a four-pass heat-exchanger of the shell-and-tube type. Its cooling surface consists of ¾-in. o.d. U-shaped tubes, which are seamless drawn No. 18-BWG copper tubing sheathed and baffled to curb flashing of the return stream.

High-pressure condensate (100 psig. and 337 F.) entering the shells is cooled to 197 F. Flash steam is condensed, and recovered heat increases incoming water temperature by 30 to 35 F. Condensate after cooling is discharged through a submerged perforated header from the condensate cooler into the receiver.

The feed water heater is also a shell-and-tube exchanger with similar copper tubing. Using live boiler steam at 100 psig., it heats condensate plus make-up water from 190 to 290 F. A quick-vent valve releases air.

Standard units are available in capacities ranging from 30 to 300 bhp., while larger models are also offered.—*Patterson-Kelley Co., Inc., E. Stroudsburg, Pa.*

Circle 109B on Reader Service Card



Forms and Glues Variety of Cartons at 175/Min.

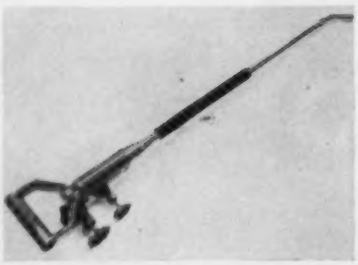
This automatic forming and gluing machine has been redesigned to produce 175 cartons or trays per min.—an increase of 50 to 100%. However, unit is also efficient at lower speed.

Called Model SG, it handles a wide variety of top-opening, hinged packages for products such as crackers, cookies, confections, frozen foods, and fruits and vegetables. It is adjustable and convertible to take low-cost blanks in sizes from 6 to 18 in. long and from 6¼ to 19 in. wide.

In operation, blanks are fed automatically and glue is applied to end flaps, while clamps grasp cartons securely to prevent slipping. A long gluing cycle permits glue to set firmly. Cartons come out squared and formed.

The mechanism is easily accessible for cleaning or adjustment. Machine is run by 1-hp. drive motor, and requires a floor area of 4 ft. 6 in.x6 ft. 9 in.—*Peters Machinery Co., 4700 Ravenswood Ave., Chicago 40.*

Circle 110A on Reader Service Card



New Steam Gun Provides Cooler, Easier Handling

This solution-lifting steam gun is designed for cool handling, cleaning efficiency, and easy operation. Applications include cleaning of machinery, floors, walls, loading docks and truck chassis, as well as in the stripping of paint.

To protect operator from heat of the steam, unit (Hurriclean) employs two concentric tubes. Steam passes through the insulated interior tube, solution through the exterior. Thus, solution reduces external gun temperature, while steam loses no heat. Solution is automatically drawn into gun's nozzle by partial vacuum created when steam passes through the inner tube.

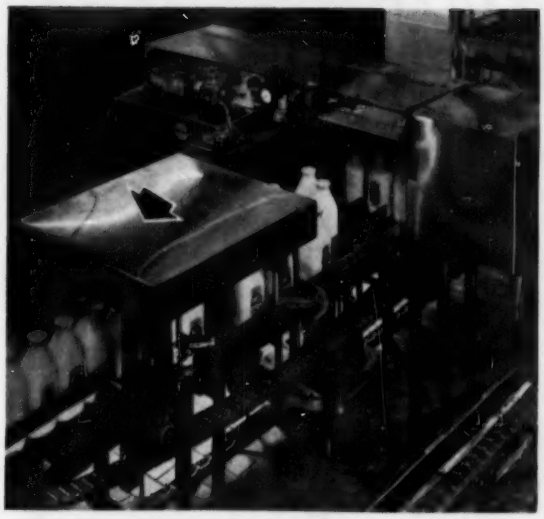
Also provided is a sealed rotary joint enabling easy nozzle handling. Forward end of the gun rotates to clean at any desired angle, while handle and hose connections remain stationary. Operator fatigue is further reduced as steam thrust is taken up between the handles to provide simpler operation.

Equipment requires only steam and solution hoses, cleaning solution made up in a drum, and 30-psi. steam. To operate, hook up hoses, mix solution, put one end of solution line in container, and adjust steam and solution valves. Rinsing is accomplished by shutting off solution valve and using steam alone.

Gun is made with a cast-aluminum spade-type rear handle, cast-brass valves, stainless-steel outer and inner tubes and nozzle, and an oil-resistant forward rubber grip. Maintenance is termed simple—there are no moving parts except brass valves and the sealed rotary joint. Low-temperature of the cleaning solution minimizes clogging or scaling, and nozzle is protected from rough treatment by an added stainless steel tip.

Unit, weighing 6¾ lb., is 3½-ft. long. Also available is a 5-ft. model.—*Oakite Products Inc., 19 Rector St., New York City 6.*

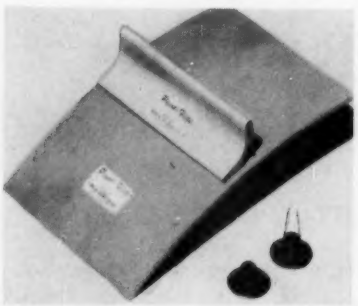
Circle 110B on Reader Service Card



New Unit Cases 144 Quarts/Min., "Fingers" Curb Bottle Breakage

Gentle bottom-handling of milk bottles in a new automatic casing system (Mapes) reportedly reduces chipping and breakage. Furthermore, speedy unit fills 12 cases (144 quart bottles) per minute, and eliminates one operator. Left: Divider (arrow) converts single line of filled bottles into three lines. These assemble on a rack where they are banded in groups of twelve. Empty cases enter unit by conveyor below and to left of bottles. Right: Rack lifts group of bottles over a case (arrow) while fingers come up vertically through cases's wire bottom to contact bottles. As rack withdraws, fingers gently lower bottles into case which discharges onto conveyor in foreground. Caser is sold and installed by—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Circle 111A on Reader Service Card



Conveyor Cleats Curb Slippage on Inclines

Termed easily attached to any belt by means of molded rubber rivets, these rubber cleats are offered for conveying loads up steep inclines.

Cleats (Pivot-Flight) can be installed on old or new belts without removing belt from conveyor. Holes are punched in belt (adhesive-backed templates are furnished), next rivets are dunked in adhesive and pulled through holes with pliers. Molded shoulders hold rivets and seal out moisture. Cleat is then attached to rivets with stainless-steel hinge pin.

Pivoted attachment and use of rivets eliminate stiffening at base of cleat and strain on belt in passing over head and tail pulleys. In case of hang up, rivets pull out without damaging belt and are easily replaced. Further, they may be transferred to new belts.

All parts are exposed for washing or steam cleaning, while resilient construction prevents bruising of fragile loads. Units are available in 1¼x1¼ or 2½x2½-in. sections, and in lengths to fit any belt width.—*Holz Tire & Rubber Company, P. O. Box 618, Lodi, Calif.*

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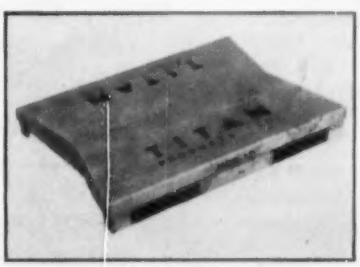


Expendable Paper Pallet Is Light and Strong

A recently developed 1-ton capacity expendable paper pallet offers numerous advantages in material handling, shipping, and warehousing.

Design of the 4-lb. unit (Titan) reportedly enables full rigid deck strength. It can be loaded, secured, and handled by methods employed for wooden pallets. Furthermore, use of expendable paper provides an important sanitation factor for the food industry.

Pallets are delivered "knock down" for an estimated 25% saving in storage space. They are easily folded, and wire-stitched or stapled as needed, assembly normally taking about 30 sec. Units are comfortably manually handled for loading and may safely be stacked four-high without damaging the base pallet.

Initial cost is said to be absorbed by savings in shipping costs, while charges for return shipping, inventory control, and maintenance are eliminated. User's name and/or product can be printed on the pallet in manufacture to give additional advertising value.

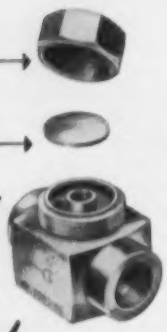
And the receiver of pallets gains the advantages of time and labor savings and paper salvage by the non-return feature.

Pallets will initially be available in 32x40-in. and 40x48in. sizes, with 2-way entry for truck forks. Safety factors include fire- and moisture-proofing.—*Titan Products Co., 165 E. 74 St., New York City 21.*

Circle 111C on Reader Service Card

New Sarco Thermodynamic Steam Trap practically eliminates maintenance!

1. A CAP
2. A DISC
3. A BODY



That's all!

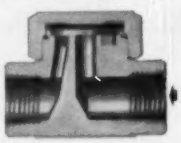
Only moving part—a hardened Solid Stainless Steel Disc—practically wear-proof!

SOME OF MANY ADVANTAGES

1. Same trap for all loads and pressures 10-600 psi.
2. Closes tight on no load.
3. Operates against back pressures up to 50% of inlet pressure.
4. Not affected by superheat, water-hammer, vibration, corrosive condensate.
5. Smallest inventory of spare parts.

SIMPLICITY—to the Nth degree!

No valve-closing mechanisms to wear or stick. No critical clearances to choke. No gaskets to leak. Three simple parts...machined from stainless steel bar stock. Only one moving part. What could be simpler?



SARCO COMPANY, INC.

2133-D

Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

Please send me: ☐ Bulletin 255-44

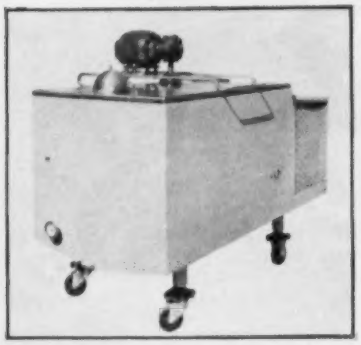
☐ A Sarco Thermodynamic Steam Trap for 60-day trial. Size_____ for installation on_____

NAME_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____



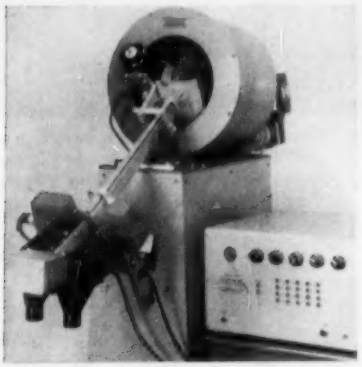
Portable Cooling Tank Simplifies Operations

When auxiliary cooling and holding capacity is required, this portable 80-gal. tank may quickly be put into service anywhere in the plant.

Compact unit (CP Bulk Cooling Tank) is ready to cool after a rubber-covered, 115-v. plug-in cord is connected to the single terminal on the tank. A ½-hp. air-cooled condensing unit (Freon) and a ⅛-hp. agitator motor make the cooler self contained.

Furthermore, easy cleaning enables rapid switching from one product to another.—*Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7.*

Circle 113A on Reader Service Card



Unit Feeds Small Articles For Packaging by Count

Designed to feed and accurately count plastic beads for packaging by count, this machine is seen applicable to items such as candies.

Speed of the unit (Feed-A-Matic) exceeds 4,000 beads per min., and counting is done by a photoelectric pickup head. Any count from 1 to 100,000 can be set by dial adjustment. Further, changeover from one size or shape to another takes 5 min.

The hopper consists of a cast-iron or cast-aluminum drum with internal pockets. As the barrel slowly rotates, articles fall into pockets where they are trapped by a baffle plate. Latter gradually covers the pockets as they approach the highest position of the barrel.

Baffle plate abruptly ends at the top allowing parts to flow out and down a chute. Part way down the chute is a knock-off wheel which rejects improperly oriented parts back into the hopper. An electric eye at the end of the chute registers number of pieces passing through, which is recorded by the electronic counter.

A housing at the end of the chute, consisting of two funnel-like exits separated by a gate, deflects parts coming down the chute and through one of the funnels. When the preset count is reached, the gate snaps over to accurately separate the last article of one count from the first of the next count.

Unit is available with 16- or 20-in.-dia. drum.—*U. S. Engineering Co., 40-24 22nd St., Long Island City 1, N. Y.*

Circle 113B on Reader Service Card

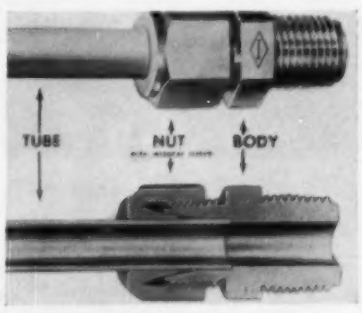
Operator Walks or Rides Dual-Control Tow Truck

Freight-handling costs from warehouse points to loading dock may be cut with use of this improved hydraulic 3-wheel tow truck.

Known as Tow-Bear, it now has dual controls which permit operator to start or stop unit while walking along either side or when riding. Truck is termed ideal for "picking" since controls are self-cancelling when operator removes his hand. Further, a freight cost of 5c. per ton is cited.

Unit operates on automotive-type batteries and has a built-in charger which may be plugged into any 110v. wall socket. Truck's components are standard automotive and industrial units, thus service or parts are readily available. — *Tow-Bear Div., Hudson House, Inc., 401 S. E. Water St., Portland, Ore.*

Circle 113C on Reader Service Card



Versatile Nylon Fittings Are Strong, Sanitary

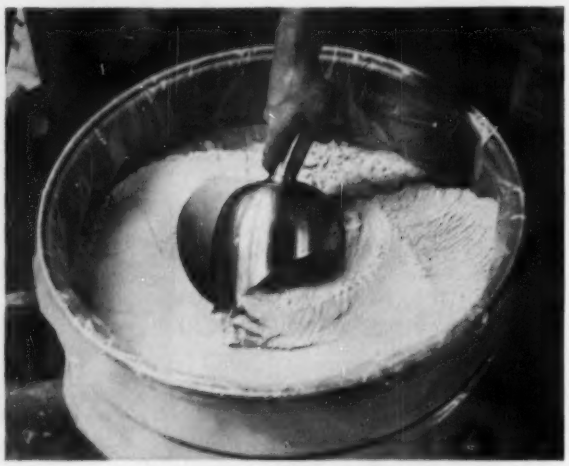
A new line of molded nylon tube fittings, designed for high impact strength, may be used with a variety of plastic or metal tubing—nylon, polyethylene, stainless, aluminum, steel, and copper.

Called Nylo-Seal, they are resistant to most acids and alkalis, and may be steam sterilized repeatedly. For food

ANOTHER WAY it pays to package in film made of BAKELITE Polyethylene

Polyethylene liner protects contents against caking due to moisture, and loss of valuable oils.

Ease of re-closing polyethylene liner maintains package tightness and is a great advantage.



Flexible Packaging Company, Chicago, Ill., made the polyethylene liners of queen film produced by **The Visking Corp.,** Terre Haute, Ind.

"...a completely dependable packaging method"

"We know it will retain all of its flavor quality." The product in this case is food flavorings and spices made by the Wm. J. Stange Company, Chicago, Ill.

It is a sensitive product. According to F. K. Koepke, assistant sales manager, "we cannot live with anything less than a completely dependable packaging method. First, we must keep moisture out, and second, loss through absorption by the container itself of flavor-giving oils must be minimized."

Using a polyethylene liner, "we seal every bit of our laboratory flavor and spice right where we want it. More than this, the liner protects flavor at the customer's location – generally kitchens subject to high humidity and heat. Both conditions can affect our products. However, polyethylene has been successful in protecting our products until actually used. The added cost over an unlined container is so small compared with the advantages that it is not even a consideration."

Flexibility. Easy sealing and re-closing. Chemical inertness. Brand identification. Availability and economy. These are a few of the important benefits of packaging in film made of BAKELITE Brand Polyethylene. Call your packaging supplier.

SPECIFY FILM MADE OF

BAKELITE
BRAND
Polyethylene Plastic

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

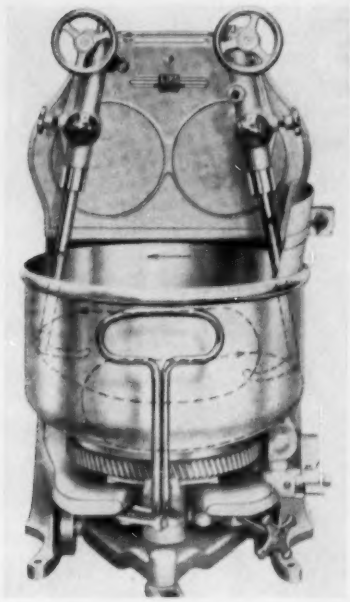
The term BAKELITE and the Trefoil Symbol are registered trade-marks of UCC

use they are specified in a natural white color.

Fittings are 2-piece units with the sleeve an integral part of the nut. No flaring of the tube is required. To make a joint, tubing is inserted into fitting body and nut is tightened.

Units withstand temperatures from −70F. to +250F., and fitting's recommended working pressures range from 150 to 500 psi., depending on temperature. They are offered in sizes from ¼ to ½ in. o.d. in unions, bulkheads, half unions, elbows, and tees.—*Imperial Brass Mfg. Co.*, 1200 W. Harrison St., Chicago 7.

Circle 113D on Reader Service Card



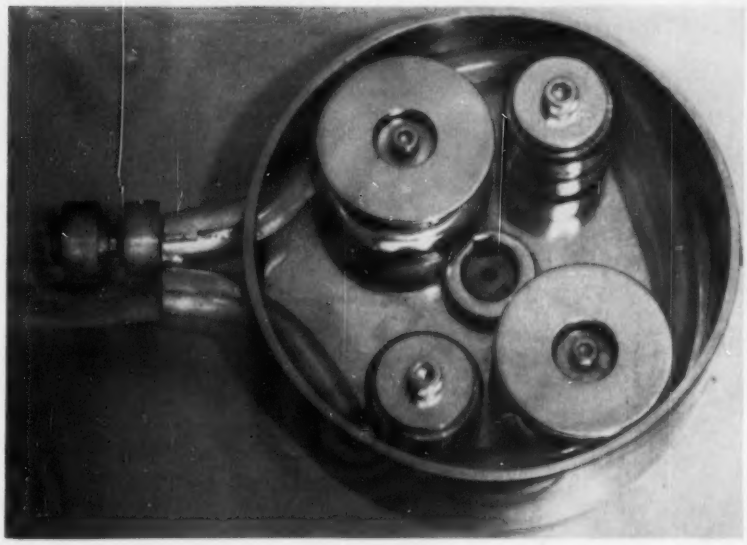
Efficient Kneading Action Marks Versatile Mixer

Employing an automotive-type transmission, this unit is designed to simulate the hand-kneading principle in its operation.

Known as Universal Mixing and Kneading Machine (Lips), its agitator arms travel in intersecting elliptical directions in a continuously rotating bowl to mix, knead, fold, lift, and stretch a large variety of food products. Arms are made of hand-forged steel and are fitted with safety devices that lock automatically. Bowls are mounted on a portable carriage, thus are easily interchanged.

Mixers are available in capacities from ¾ to 3 bbl.—*Henry Laber & Assoc., E. Houston & Pitt Sts., New York City 2.*

Circle 115A on Reader Service Card



New Hose-Type Pump Has Many Applications

Versatility, sanitation, and ease of maintenance are advantages cited for a new hose-type positive-displacement pump of very simple construction.

Low-cost unit handles solids, liquids, semi-solids, and corrosive materials. Applications include pumping of molasses, shortening, icings, and doughs. Dry cereals can be handled with about ½% breakage, and peas have been successfully pumped.

Device may also be used as an accurate proportioning pump, or as a mixer by recirculation. And it can be adapted as a refrigeration compressor, or automobile fuel pump.

Unit consists of a stamped-steel or plastic shell, four steel self-lubricating rollers, and plastic or synthetic-rubber elliptical tubing. Two small rollers apply pressure, while the larger ones permit the tube to expand. Thus, material is squeezed through the tube. Squeeze rollers are recessed to permit pressure relief in hose when line is shut off.

Capacities vary from 1 qt. per hr. to 750 gal. per min. A 30-in. vacuum or pressures up to 800 psi. are possible with a single stage, while multistage arrangement permits high lift. Operating temperatures are from −10 F. to 300 F.

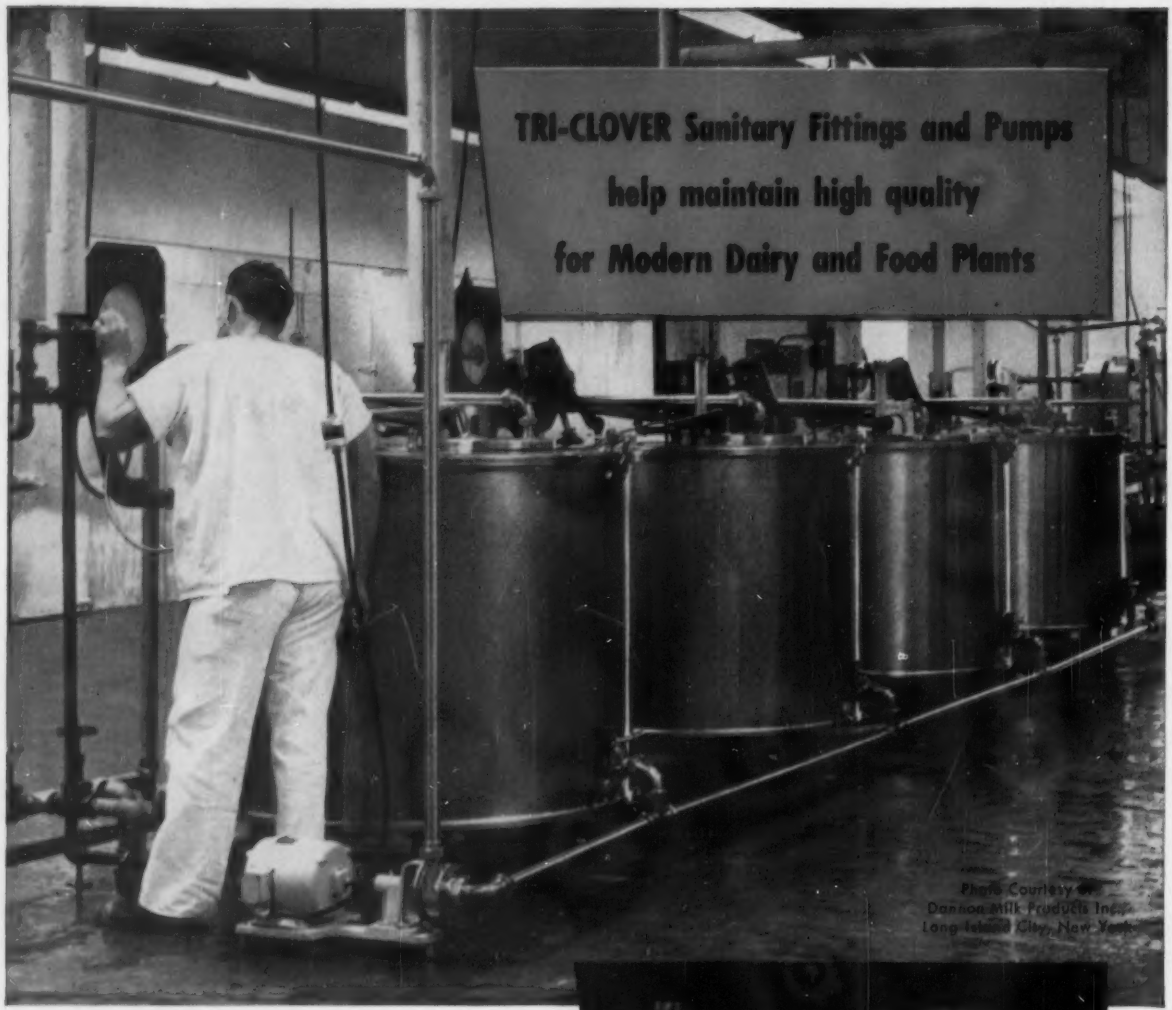
Sanitary pump may be cleaned by circulation of detergent, and there are no packings. In accelerated tests, unit has been run to 5,000 hr. with Neoprene hose. Replacing the tube takes about 5 min.—*Jerome Murray Corp., 401 E. 58 St., New York City 22.*

Circle 115B on Reader Service Card

New Bulk-Flour Trailer Has Air-Slide Unloading

A new van trailer, designed for minimum weight through use of stainless steel and aluminum, handles 18-ton bulk-flour shipments. Equipped with air-slide unloading (Fuller), it delivers the load in 1 hr.

At present, flour is loaded by gravity through three hatches in the top

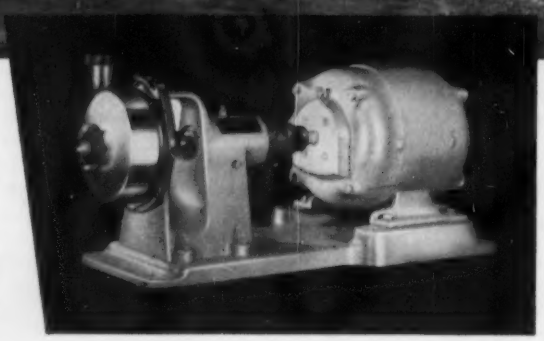

TRI-CLOVER Sanitary Fittings and Pumps
help maintain high quality
for Modern Dairy and Food Plants
Photo Courtesy of
Dannon Milk Products Inc.
Long Island City, New York

Shown on the job in *natural, sparkling clean condition* is a typical modern dairy conveying line complete with Tri-Clover Sanitary Stainless Steel Valves, Fittings, Tubing and a Sanitary Centrifugal Pump. This is the type of Tri-Clover set-up that makes it easy for the dairy industry to maintain high quality and meet exacting 3A Standards. This is the type of conveying line that makes it easy for you in the food and beverage industries to meet *your* local sanitary codes.

Features like sweep ell construction—clean cut, accurate threads—and highest quality materials and fabrication—these are the features that you need and want for your replacement or new line needs. These are the features that you get in a Tri-Clover installation!

And another important thing, Tri-Clover is equipped to handle your complete job from "tee to angle cock—from centrifugal pump to magnetic trap." *You can depend on Tri-Clover as your one reliable source for all types of sanitary fittings, valves, pumps, tubing or allied specialties.*

See Your nearest TRI-CLOVER DISTRIBUTOR
EXPORT DEPARTMENT, 8 So. Michigan
Chicago, U.S.A., Cable: TRICLO, CHICAGO



Shown above is one of the complete line of Tri-Clover Sanitary Centrifugal Pumps designed especially for use in the Dairy and Food Industries. These modern, high efficiency units are backed by years of specialized experience. For full details, send for the new Tri-Clover Sanitary Pump Catalog.

LADISH CO.
Tri-Clover Division
KENOSHA WISCONSIN

of the van. However, this method will be superseded by an air-pressure loader which will increase the load to the unit's rated capacity of 22 tons.

At the bakery, the trailer is unloaded by the air-slide which is operated by two blowers mounted under the rear deck. Flour is delivered to storage bins via a 4-in. air hose, while discharge may be 100 ft. above ground level.

Trailer and tractor (White) have dual rear axles. The basic trailer unit is 33½ ft. long and has an inside height of 6 ft. 7¼ in. Capacity is 1,350 cu. ft., weight (complete with air-slide equipment) is 14,640 lb.—*Fruehauf Trailer Co., 10967 Harper Ave., Detroit 32.*

Circle 115C on Reader Service Card

Kit Converts 30-Gal. Can To Vac-Cleaning Tank

An auxiliary tank kit is designed for general-building maintenance where large wet- or dry-tank capacity increases job efficiency. It includes all attachments necessary to convert a standard 30-gal. waste can into an auxiliary tank. Latter is connected ahead of the vacuum.

Kit contains a hose adapter, swivel attachment, nut and ring, curved tubes, curved swivel tubes, gaskets, bolts, and nuts. Use of this tank is said to eliminate a special cleaner for boiler cleaning only. The auxiliary unit can be left in the furnace room with the vacuum being attached when necessary.

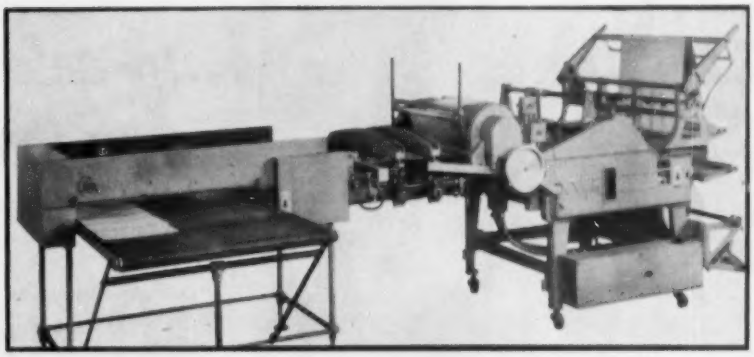
In addition, kit allows cleaning of hazardous areas. The vacuum unit, with separately ventilated motor, is left in a safe place while operator, using auxiliary tank, works in the danger zone. Equipment is easily interchangeable with two or more cans and operates with any commercial cleaner. —*Premier Co., 755 Woodlawn Ave., St. Paul 1, Minn.*

Circle 117A on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard—back of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.



Automatic Stacker Ups Bag-Making Efficiency

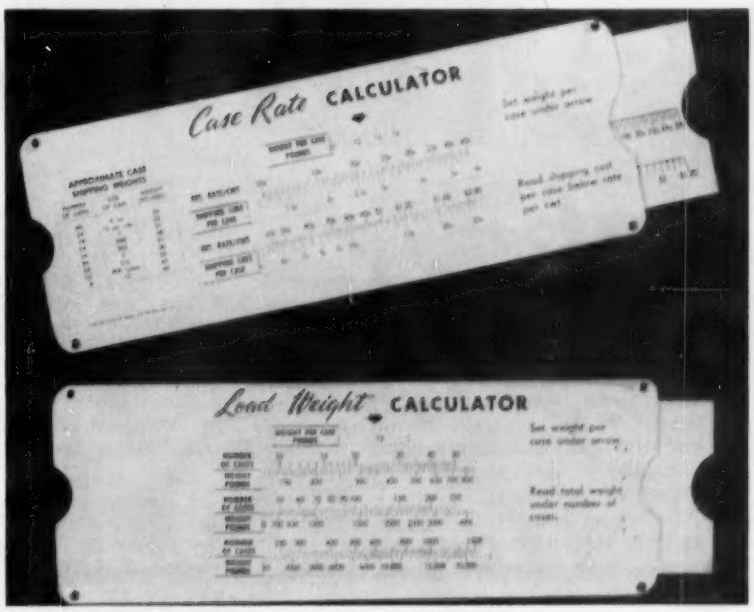
Polyethylene bag-making machines reportedly are made more versatile by a new automatic stacker designed for use with maker's Model 24-7 machine (Simplex).

The attachment is available for right- or left-hand mounting. It stacks flat or gusset polyethylene bags or drum liners from 4x2¾in. wide by 3x60 in. long at speeds up to 55 per min. No adjustments are required for most changes in bag size.

Unit automatically sorts straight or curved-bottom bags into stacks of 10, 25, or 50 to a single pile, while a counter keeps accurate tabulation of individual bags. Thus, one operator may sort and pack the output of several machines, and multiple bags can be stacked in parallel runs from tubular stock. Each bag is controlled by grippers from knife head to final sorted stack.

A "stop-and-seal" device is included for uniform tight center seal over the length of formed flat stock. This sealing cycle, plus the revolving drum which prevents tension as the seal cools, is said to eliminate pin-hole imperfections and burnt spots.—*Simplex Mfg. Div., Food Machinery & Chemical Corp., 534—23rd Ave., Oakland, Calif.*

Circle 117B on Reader Service Card



Quickly Gages Freight Cost and Load Weight

Freight cost for goods on a per case basis is quickly and easily computed with use of a new slide rule called Case Rate-Load Weight Calculator. Reverse side shows number of cases required to complete a minimum car or truck-load shipment for units weighing up to 60 lb., and for any quantity up to 1,500 cases.—*J. W. Decker, P. O. Box 93, Hoopeston, Ill.* Circle 117C on Reader Service Card

It's time ...to ask your suppliers for IONOL®, C.P. *impregnated packaging...*

newest, low-cost way to protect foods against oxidative spoilage

When fats and oils migrate from food product to box or wrapper, they rancidify quickly, causing deterioration of flavor and aroma.

The effective way to combat this serious threat to product shelf life is to incorporate Ionol, C.P.—a most efficient antioxidant—into the boxboard or wrapping material. Rancidity is then stopped right where it begins, at the *surface*.

In actual tests, baked goods stored at 85°F in Ionol, C.P. impregnated boxboard cartons, were free of rancidity at the end of ninety days. Without Ionol, C.P. protection, baked goods stored under similar conditions, often develop rancidity within a week.

When your food products contain fats or oils, Ionol, C.P. impregnated boxes or wrappers will greatly prolong shelf life. Additional protection can be assured by using Ionol, C.P. as a direct ingredient in your food products.

Ask your packaging materials supplier for this modern way to protect the good name of your brand label. Write to Shell Chemical for names of suppliers of Ionol, C.P. impregnated packaging.

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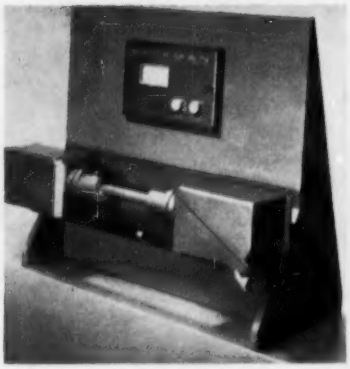
IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited • Montreal • Toronto • Vancouver



Beer Clarity Checked By Photoelectric Unit

Operating on the photoelectric principle, this longpath flow colorimeter is designed to protect customer acceptance of beer by continually monitoring the final product for clarity and turbidity.

The instrument detects protein haze or suspension in finished beer, thus giving a constant check on filter efficiency. It is also useful during the filter precoat cycle. Employing a 25-cm. pathlength, it indicates in percent transmittance and will operate a standard potentiometric-type recorder or an alarm system.

Device is installed downstream of the final filter. Thermospacers are used to prevent window fogging at low temperatures. Beer color has no effect since the light wavelength used to measure turbidity is one at which beer does not absorb. And with the product under pressure, bubbles do not interfere.—*Beckman Instruments, Inc., Fullerton, Calif.*

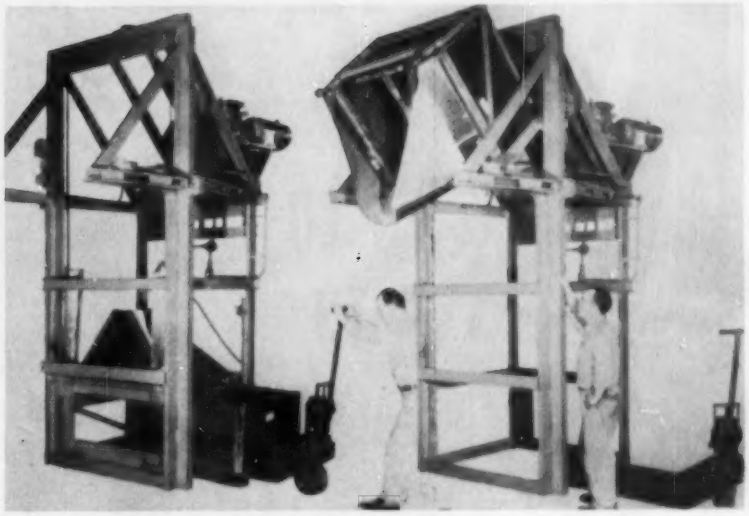
Circle 119A on Reader Service Card

Scale Is Easily Removed With Chelating Agents

Heat-exchange equipment may be kept free of mineral and organic scale by regular use of chelating agents, which eliminate alkali and acid treatment and physical scraping.

The stoichiometric amount of chemical (Tetrine) is dissolved in 3 to 5% solutions of caustic soda or soda ash, then circulated through system at 200 to 210 F. Treatment time, usually 2 to 8 hr., depends on amount of scale present, and subsequent applications may be necessary for heavy deposits.—*Glyco Products Co., Empire State Bldg., New York City 1.*

Circle 119B on Reader Service Card



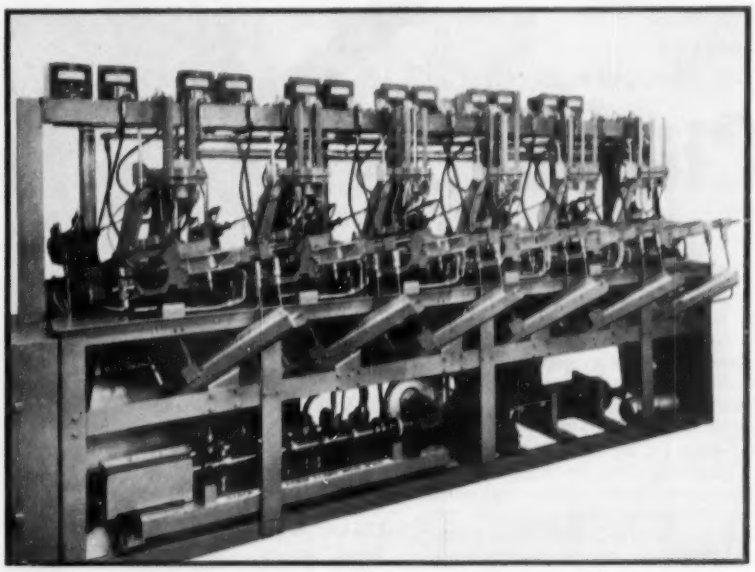
Automatic Lift-Dump Units Ease Material Handling

Seen saving time and cutting costs in materials handling is a new line of lifter-dumpers. They are designed to handle any type of container — drum, barrel, bag, or box.

Unit shown above (Powrdumper Model 32) raises loads in excess of 2,000 lb., turns the container to any desired dumping angle, and discharges the contents without waste. Lift is loaded from the front and discharge height is up to 40 ft. Also offered are models for loads less than 2,000 lb.

Various cycling can be furnished from operator control to automatic.—*Langley Mfg. Co., 920 Cambridge St., Cambridge, Mass.*

Circle 119C on Reader Service Card



High-Speed Unit Forms Variety of Plastic Lids

Production of transparent plastic lids for paper food containers at speeds up to 72 per min. is reported for a new machine called EM-132.

Formed from blanks of 10-mil Polyflex (an oriented polystyrene sheet, Plax Corp., Hartford, Conn.), lids are termed dimensionally stable, tasteless, and odorless. Either the insert or flush-fill type for 8, 12, or 16-oz. containers can be made. Furthermore, they are designed for positive cup retention, hence a sanitary seal.

Unit permits two printing meth-

let us make a

Clipper *joint . . .*

for you

Are you looking for a better, faster way to fasten belts, aprons, tapes or ribbons? Would you like to slash maintenance time by putting an easy-to-fasten joint in endless belts? The fastest way to join these ends is with Clipper Hooks and Lacers.

Long used for lacing power transmission belting, Clipper fasteners are now proving their cost-cutting value in materials handling equipment, automatic pin setters, laundry equipment, food harvesting and processing equipment and in many other applications.

They produce a smooth, flexible joint in a hurry.

Let us demonstrate the advantages of a Clipper joint on the product of your choice. Send us a small sample (or the complete belt, apron, tape, or what have you) and we'll make you a Clipper joint FREE, without obligation.

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Ask your Industrial Distributor for Clipper Products

Clipper BELT LACER COMPANY

988 Front Ave., N. W., Grand Rapids 2, Michigan

Equipment & Supplies

ods. Before blanking, material may be printed in a continuous web. Or lids may be printed or colored individually after forming. Also, they may be embossed during the forming stage.

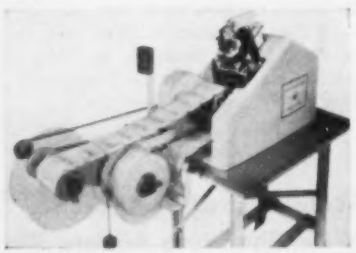
Machine has six forming units with individual controls. Thus, any unit may be independently stopped for mold changes or repairs without losing production of the rest. Proportional controls regulate forming temperature, while the cam-operated valves and switches time hydraulic cylinders which operate moving parts. Equipment may use either split or solid molds.

In operation, magazine-loaded blanks are automatically transferred one at a time by a vacuum cup to the heated mold cavity. A blank is gripped around its edge to prevent curling away from the mold. For insert-type covers, lids are formed by two rings. Inner portion of the lid is formed by blowing compressed air against warm plastic, forcing it into cooled portion of mold cavity.

After the plastic solidifies, mold opens and lid is ejected by a knock-out plate and a stream of air. Finished covers then fall into an inclined chute, where they are automatically stacked for packing.

An operator is required only for loading blanks and removing finished lids.—*Standard-Knapp Div., Emhart Mfg. Co., Portland, Conn.*

Circle 119D on Reader Service Card



Unit Prints Variable Data On Die-Cut Roll Labels

With this unit, food processors who package their products may imprint price, weight, ingredients, and similar variable data on die-cut roll labels.

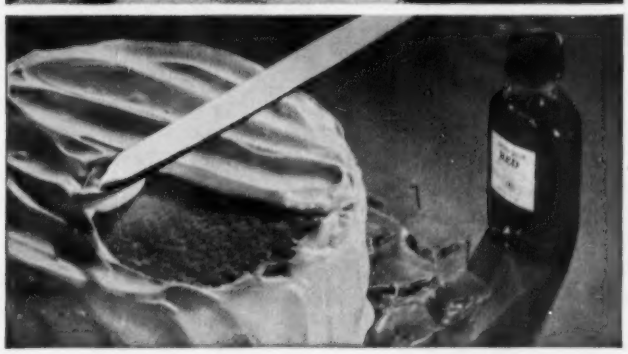
Machine (Model 88A) permits marking of partially pre-printed labels as they are needed. A maximum area of 6x2 in. can be imprinted on labels up to 6x4 in. Rates range from 100 to 125 per min., depending on label stock.

An accurate pin feed mechanism regulates feed and maintains registration of imprint. Change in label

DOW

DOW PROPYLENE GLYCOL, U. S. P.

HIGH-EFFICIENCY SOLVENT FOR FLAVORS AND COLORS



Gaining wide acceptance for versatility and economy . . . a good bet for improving your products, too

Big reason for the wide acceptance of Dow propylene glycol, U.S.P., is its extremely high solvent ability. Natural result of this efficiency is greater economy of manufacture. You'll find these advantages of propylene glycol extending over a wide range of flavoring raw materials, too.

Food colors, emulsified flavors and flavor concentrates also benefit from propylene glycol's excellent solvent action. Many makers of food colors have replaced other solvents with propylene glycol with remarkable savings and only minor reformulation. A big advantage in formulating emulsified flavors is gained by the wetting action of propylene glycol which increases the stability of these emulsions.

The dependable quality and prompt delivery of Dow propylene glycol, U.S.P., can simplify your production and scheduling. For a free sample and property information, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 809E-2.

you can depend on DOW CHEMICALS DOW

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CARRIED BY MODERN TANK CAR SERVICE!

Whatever your "liquid assets" are, you can look to Shippers' Car Line for prompt, low-cost transportation. The reasons are simple: The world's most *modern* equipment—the revolutionary DURADOME tank car is leased and sold exclusively through Shippers'. A network of *modern* repair shops—strategically located to keep your cars in top shape. 35 years of *specialized* experience in the operation and maintenance of tank car fleets for industry.

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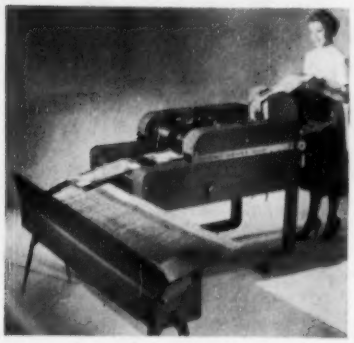
spaccout is easily accomplished by interchanging feed unit. Equipment rewinds labels in rolls, ready for use in label-applying or packaging machines.

Imprinting is done by solid rubber plates, electros, or master plates with or without removable type for variable data. Fast-drying, durable marking compounds are available in many colors for various label stocks.—*Markem Machine Co., Keene 53, N. H.*

Circle 120A on Reader Service Card



Carton Imprinter Solves Inventory Problem

By imprinting cartons or other containers as needed, this unit eliminates the need for large inventories of pre-printed packaging materials.

Called Model 4800, it automatically feeds, imprints, and power-stacks at 10,000 pieces an hour. Items include folded boxes and cartons, bags, tags, packing envelopes, and cardboard stock.

Machine accommodates material sizes from 2¼x2¼ in. up to 18x18 in., and thicknesses from 0.010 to 0.187 in. Uncoated, varnished, or paraffin surfaces up to 4x18 in. are imprinted in any direction with either rubber mats or metal type.

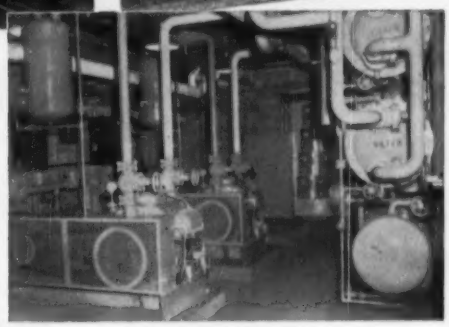
Operation is termed simple as pieces are fed to a printing drum which applies fast-drying ink for sharp imprints. Simultaneously, the stacker handles the output for efficient unloading.

Unit can be set up quickly for changes in imprint and piece size without use of tools. Other features: A liquid inker filled without stopping the machine, outside controls in one handy panel, ball bearings, and an easily cleaned smooth finish.

Floor space required is 76x64 in., including stacker.—*Pitney-Bowes, Inc., 3834 Walnut St., Stamford, Conn.*

Circle 123A on Reader Service Card

Sioux City Dressed Beef Company, Inc.
Sioux City, Iowa.



Q. How can you operate the most modern refrigeration system for packing plants?

A. use *Vilter* REFRIGERATION that *costs less to own**

THE PLANT—Another outstanding addition to the Sioux City packing industry is the new Sioux City Dressed Beef Company plant. Modern in every respect . . . this plant is completely streamlined, all processing operations and handling are on one level. From past experience, the management was well acquainted with the excellent performance of Vilter refrigeration equipment . . . so Vilter engineering and units were the natural choice for the refrigeration job.

THE SYSTEM—The refrigeration layout comprising Vilter units is as follows: *Large Chill Room* which holds approximately 400 beef, three 1750 FUB 12-row coils; *Freezer* which is used for freezing all the offal, one FUA 1500 10-row coil; *Offal and Packing Cooler*, one 750 FUB air vent with 12-row coil; *Hide Cellar*, two 180 DUC units; *Machine Room*, a Vaporiter to handle the high suction plus the discharge from the booster compressor. Two Vilter six-cylinder compressors take the full load. Refrigeration is fully automatic.

THE TESTIMONIAL—After months of operation, the management of the Sioux City Dressed Beef Company are happy with the Vilter refrigeration system. When you kill beef one day and ship the next, you have to have refrigeration of the best—that's why they chose Vilter.

THE ANSWER—The answer is always Vilter. With Vilter you can be sure. With a research staff probing into future needs and seeking better ways . . . with units engineered for the job . . . with construction by craftsmen who take great pride in their work, it is no wonder that Vilter units are known for their long, trouble-free operation and efficient performance. Let Vilter engineer your next refrigeration job.

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter®

QUALITY CRAFTSMANSHIP that lasts . . .

ENGINEERING DESIGN that guarantees performance

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, MILWAUKEE 7, WIS.

Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water and Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice and Polarflake Ice Machines

Push Button Quality Control

20,000 Batches a Year!

For closer, *automatic* control over cake and pastry sweeteners, Fischer Baking Co. switched their Asbury Park plant to liquid sugar . . . with accurate measurement provided by this Neptune Auto-Stop meter. Every 15 minutes the baker pushes buttons to set the pounds required, and opens the valve. The meter follows through . . . shuts off automatically at the right pound. Big savings are reported in time and labor. No more carting, piling, scaling, and dumping of granulated sugar. It's neater, too, because the sugar stays *inside* pipes and tanks all the way.

Trouble-free operation 20,000 times a year at Fischer's plant is only one of *many* cases where Neptune meters have proved dependability and sustained accuracy in food plants.

Free Metering Data Helpful booklet covers 150 industrial liquids, including water, syrup, liquid sugar, cocoa butter, cocoanut oil, chocolate, flavors, coffee, wine, alcohol, etc. Meters range from simple totalizers to Auto-Stops with electrical switch adaptations for controlling pumps, agitators, valves, etc. All have totalizing counters for accurate cost and inventory control.
Ask for Bulletin 566-VF.

NEPTUNE METER COMPANY
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Equipment & Supplies

Barrel Dumping Sped With Automatic Unit

Automatic action, said to do the work of 15 to 20 men, is offered by a new dumper of galvanized construction.

Known as Hydraulic Barrel Dump, it provides hydraulic control at all tilt angles. Barrels to be emptied can easily be positioned within the dump unit by fork-lift truck, and no clamps or hooks are needed to hold it in place during dumping.

Unit handles standard 55-gal. or 2,500-lb.-capacity barrels, and adapts to any shape vessel. It takes just 30 sec. for a dump-and-return cycle. Device may also be furnished with stainless-steel roller which separates solid from liquid material.

Equipment includes 3-hp. motor and 20-gal. reservoir tank, which may be mounted on floor, wall, or ceiling. —*F. H. Langsenkamp Co., 229 E. South St., Indianapolis, Ind.*

Circle 124A on Reader Service Card

Lightweight Insulation Withstands 1800 F.

Numerous advantages are cited for a new heat-insulation product that withstands temperatures up to 1,800 F.

Called Kaylo-20, it is used primarily as covering for pipes and vessels. Material expands only silghtly up to 1,000 F., and at 1,800 F., its shrinkage is limited to about 1½%.

In addition to heat-control properties, it offers lightweight (11 lb. per cu. ft.) and strength (150 psi. under compression). It is insoluble in water, and dries to original thermal efficiency and strength without shrinking or warping. Furthermore,

NOT THIS .....

..... BUT THIS!

Pfizer BI-CAP Single Strength type AM

Pfizer BI-CAP Single Strength type BM

Pfizer BI-CAP Double Strength type CM

(You have a choice of single strength products with reduced iron or iron pyrophosphate, or a double strength product with reduced iron. All three forms of BI-CAP are made with Thiamine Mononitrate for improved Vitamin B_1 stability.)

BIG ADVANCE IN ENRICHMENT CONCENTRATES...

NEW LIGHT-COLOR PFIZER BI-CAP®

AND COLOR ISN'T ALL! The Pfizer Riboflavin in BI-CAP mixtures has a new crystalline structure. This imparts not only improved color, but gives BI-CAP other superior characteristics, as well.

For example, Pfizer Riboflavin is designed to overcome aglomeration in flour. It is this undesirable aglomeration often found in finished flour which causes uneven enrichment and produces discolored spots. This Pfizer safeguard is just one of many product improvements made possible by Pfizer's expanded program of production and research in riboflavin, thiamine and other ingredients for the flour milling industry. Contact Pfizer and a warehouse near you will quickly provide the new, improved BI-CAP. For additional information and technical details mail the coupon below.

Chas. Pfizer & Co., Inc., *Chemical Sales Division*
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☐ Please send me a sample of new, improved, lighter-colored Pfizer BI-CAP, Type ☐ AM ☐ BM ☐ CM

☐ Please send technical details on PFIZER BI-CAP

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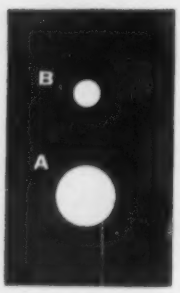
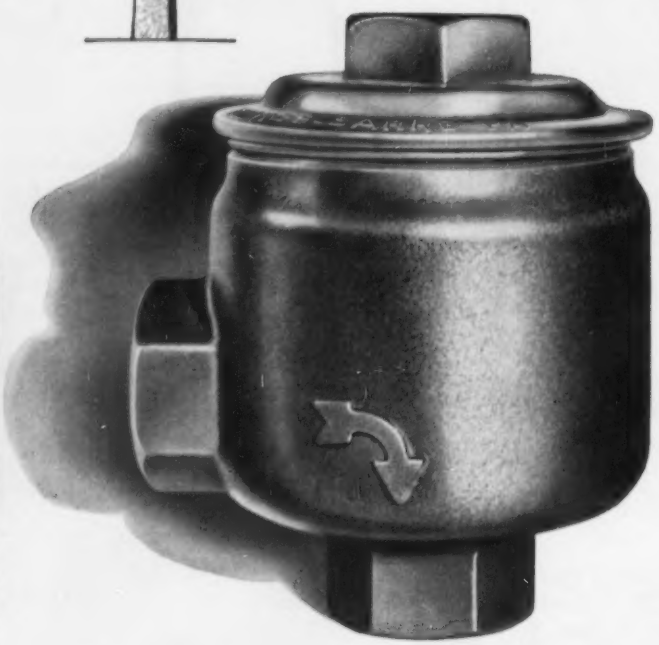
Manufacturing Chemists for Over 100 Years Pfizer

TALK ABOUT

Capacity



Discharge orifice of 1" NICHOLSON trap (A) compared with other types of same size (B). Nicholson's greater—*in every size!*



Compare capacity of a Nicholson Steam Trap with any other trap of same size. Greater capacity—right across the board—means Nicholson Industrial Traps discharge condensate and air from steam lines and process equipment *faster*, more *effectively*. In toughest food processing service, Nicholson's pay off 4 ways:

- **lower initial cost—more for the money**
- **less upkeep expense—minor maintenance**
- **faster warmup—high, even temperatures**
- **faster production—increased 20% to 30%**

Where performance counts, specify Nicholson. Write for *Catalog 953*.

NICHOLSON

W. H. NICHOLSON and Company

TRAPS • VALVES • FLOATS • METAL PARTITIONS

14 OREGON STREET, WILKES-BARRE, PA. • SALES AND ENGINEERING OFFICES IN 58 PRINCIPAL CITIES

the insulation is termed easily cut and sawed, thus adapts to irregular surfaces.

The pink-colored product is made in thicknesses and diameters for pipe sizes from ½ to 39 in. Outside diameters correspond to those of standard pipes for proper fit and to permit nesting. Blocks are made 36 in. long in standard widths up to 18 in., thicknesses up to 3 in. — *Owens-Illinois Glass Co., Ohio Bank Bldg., Toledo 1, Ohio.*

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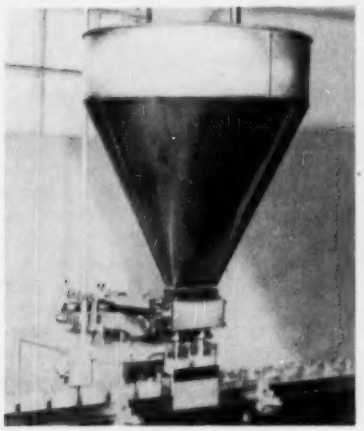

Twin-Piston Unit Fills Liquids, Semi-Solids

Items such as horseradish, relish, and mustard are filled into containers of various sizes and shapes by this automatic twin-piston unit.

Known as "Simplex" Model T, it fills 4 to 32-oz. containers at speeds of 30 to 60 per min. Unit employs a rising table to eliminate air pockets during the straight-line operation, and all contact parts are of stainless steel.

Furthermore, dismantling time for cleaning is said to be less than 5 min. —*F. L. Burt Co., 571 Seventh St., San Francisco.*

Circle 127A on Reader Service Card

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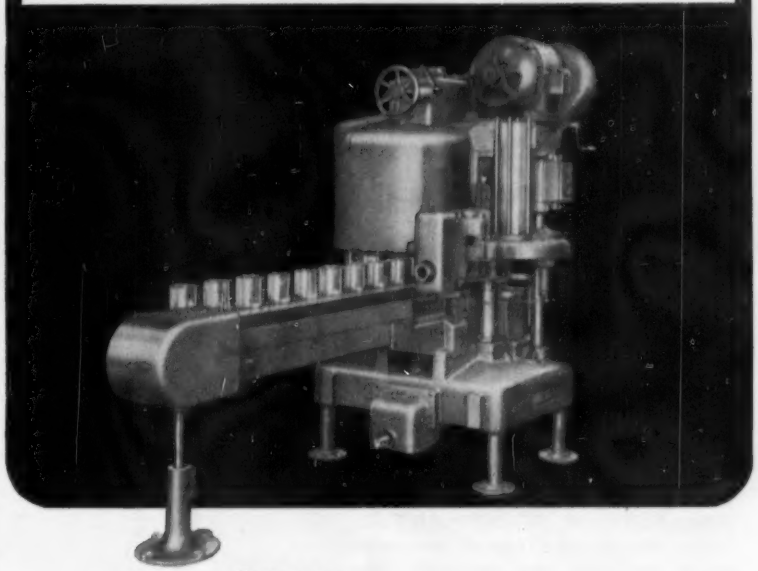
Swing To...

ANGELUS
CAN CLOSING MACHINES



Welcome to the Angelus Booth
Annual Canning Machinery & Suppliers Association Convention
Atlantic City—Jan. 19-21, 1956

Through demonstration and personal inspection you can make your own appraisal of what Angelus means by dependability of operation, economy and simplicity of maintenance, and low investment costs that have canners and can makers the world over swinging to Angelus Can Closing Machines.

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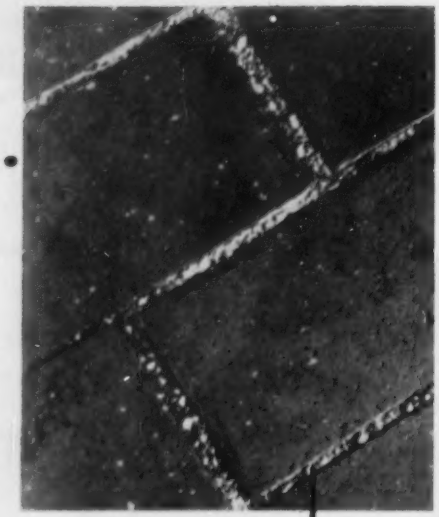
NOW... for the first time!



...the realistic solution to food plant floor protection

NOW you can put an end to floor troubles . . . like the corrosion damage pictured above. You can put down a floor to stay. Lasting beauty . . . long service . . . and assured installation techniques are, for the first time, all combined in a single floor developed especially for the food industry.

Corrosive acids from fruit juices eat concrete

Atlas FURNANE FOOD PLANT FLOORS resist the whole range of corrosive food plant products and residues. Not only are they inert to acids, sugars and biologicals, but they also resist alkalies, oils, greases, salts and cleaning agents.

Sugars and syrups attack concrete

FURNANE Food Plant Floors are also strong physically. They can be installed by either tilesetters' or bricklayers' methods. A clean smart appearing floor results . . . with flush solid joints.
Why continue to pour money into questionable floor construction and continued maintenance?

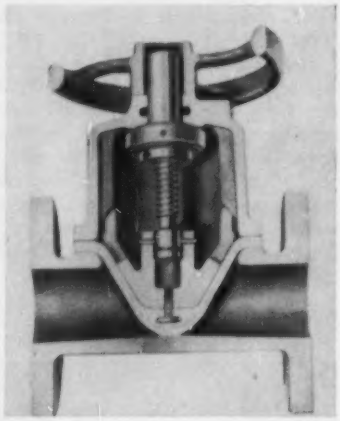
Dairy and meat products are corrosive

Write today for ATLAS BULLETIN 3-2 giving complete information.

Cleaning agents, greases, oils must be considered

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

Equipment & Supplies



Diaphragm Valve Permits Straight-Through Flow

Numerous advantages are cited for a new diaphragm valve, designed for straight-through flow of viscous materials, fibrous slurries, sludges, semi-fluids, and solids in suspension.

Shown in closed position, unit (Straightaway) operates without restriction or stoppage and offers minimum pressure drop. Rodding or brushing may be accomplished without removing valve bonnet, and without damage to body linings. It is self-draining when pipe line is sufficiently pitched.

Other advantages: Positive closure even when handling gritty or fibrous material; isolation of bonnet from fluid stream; wide range of body and bonnet styles as well as body, lining, and diaphragm materials; and simple maintenance. Only the diaphragm is normally subject to wear and is easily replaced. There are no packing glands, disk holder, or metal-to-metal seat.—*Grinnell Co., Saunders Valve Dept., 260 W. Exchange St., Providence 1, R. I.*

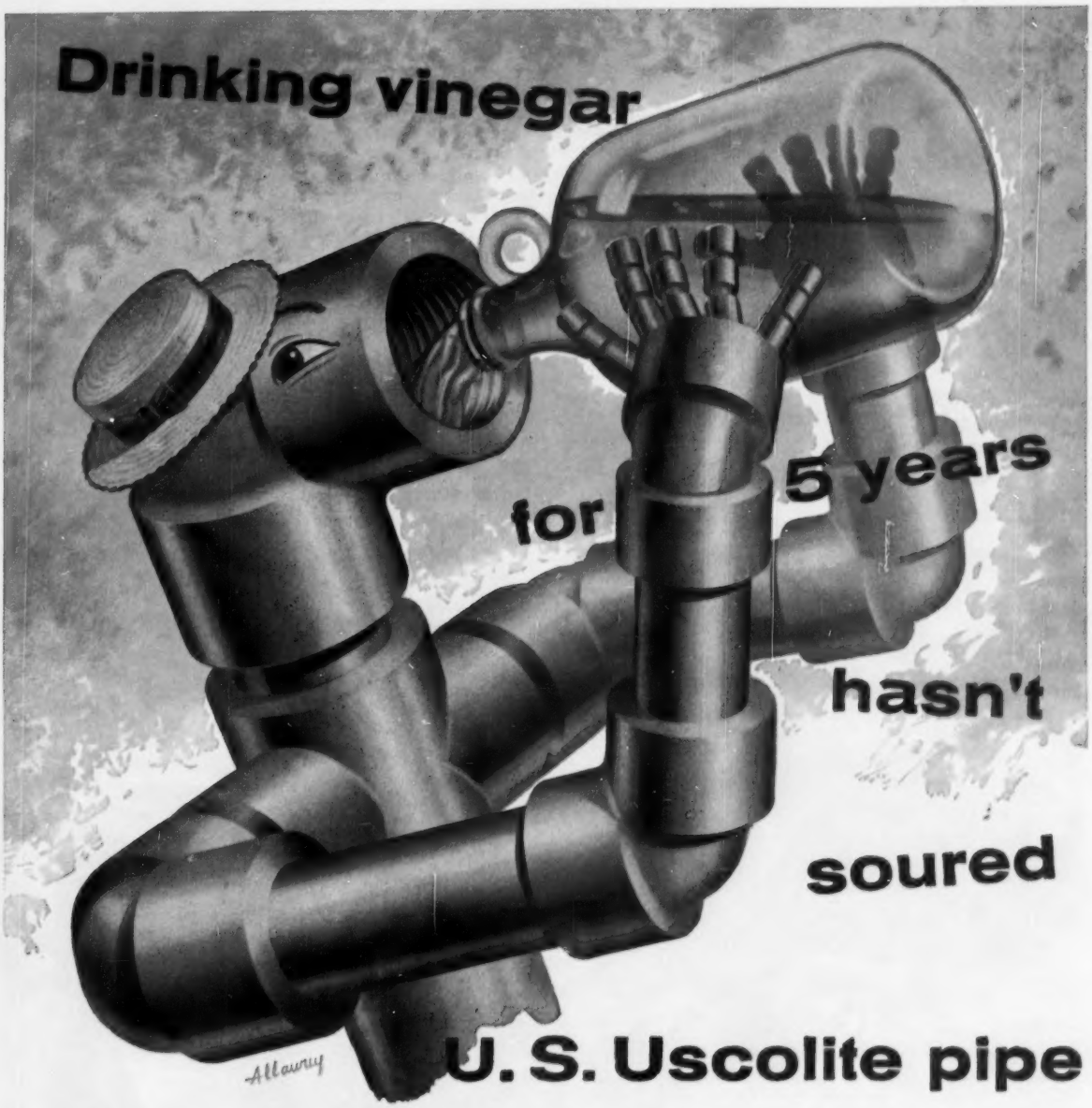
Circle 128A on Reader Service Card

Lab Air-Conditioning Unit Offers 99% Bacteria Kill

A laboratory air-conditioning system, in which a germicidal lamp is installed in a new low-velocity air diffuser, offers 99% bacteria-free air.

By limiting air velocity to 300 ft. per min., unit (Multi-Vent) permits longer exposure to germicidal rays, thus provides higher efficiency. In addition, it offers draftless air-conditioning and even temperature control. — *Multi-Vent Div., Pyle-National Co., 1334 N. Kostner, Chicago.*

Circle 128B on Reader Service Card



A plant in Louisiana uses U. S. USCOLITE® plastic pipe to carry vinegar from processing to storage vats, and from storage vats to pasteurizer and then to bottler. Previously, metal pipe had been used, and averaged *2 years' service life.* But USCOLITE has been in use steadily for over 5 years and shows not the slightest sign of corrosion or wear...gives every sign of lasting indefinitely. It imparts no odor, taste, discoloration or contamination. USCOLITE gives full flow at all times—never clogs up.

USCOLITE *pipe is tough—has extremely high impact strength.* USCOLITE pipe, fittings, flanges, valves (Hills-McCanna) come in the broadest and largest line of stock sizes on the market.

Look to USCOLITE pipe whenever corrosion is a problem. USCOLITE is doing great work in chemical processing plants, paper mills, food processing plants—to name but a few industries. Extremely tough but light in weight, it can be easily threaded and installed with conventional tools. For replacements or a completely new pipe installation, get in touch with any of the 27 "U. S." District Sales Offices or write us at Rockefeller Center, New York 20, N. Y.

US RUBBER

Mechanical Goods Division

United States Rubber

For more data, circle this page number on card at back → 129

If you use MILK or

N.F.D.M.S.

...see how

Sweet Dairy Whey

can improve quality
and reduce costs TOO!

SWEET DAIRY WHEY is an improved dairy ingredient that perfects the richness of "old-fashioned flavor" in modern food preparations. It improves color, texture, shelf-life and appearance of food products. And it can save you money too — up to 50% of your dairy ingredient costs — by replacing part or all of your present dairy solids.

If you use milk, or nonfat milk products, it will pay you to investigate Sweet Dairy Whey. It's spray dried, meets or exceeds U. S. Extra Grade standard. In addition to extensive use in the baking and meat industries, here are just a few of the ways Sweet Dairy Whey is being used to improve food products today:

Sherbet — for better control over texture, appearance, flavor. Reduces flavoring costs, too.

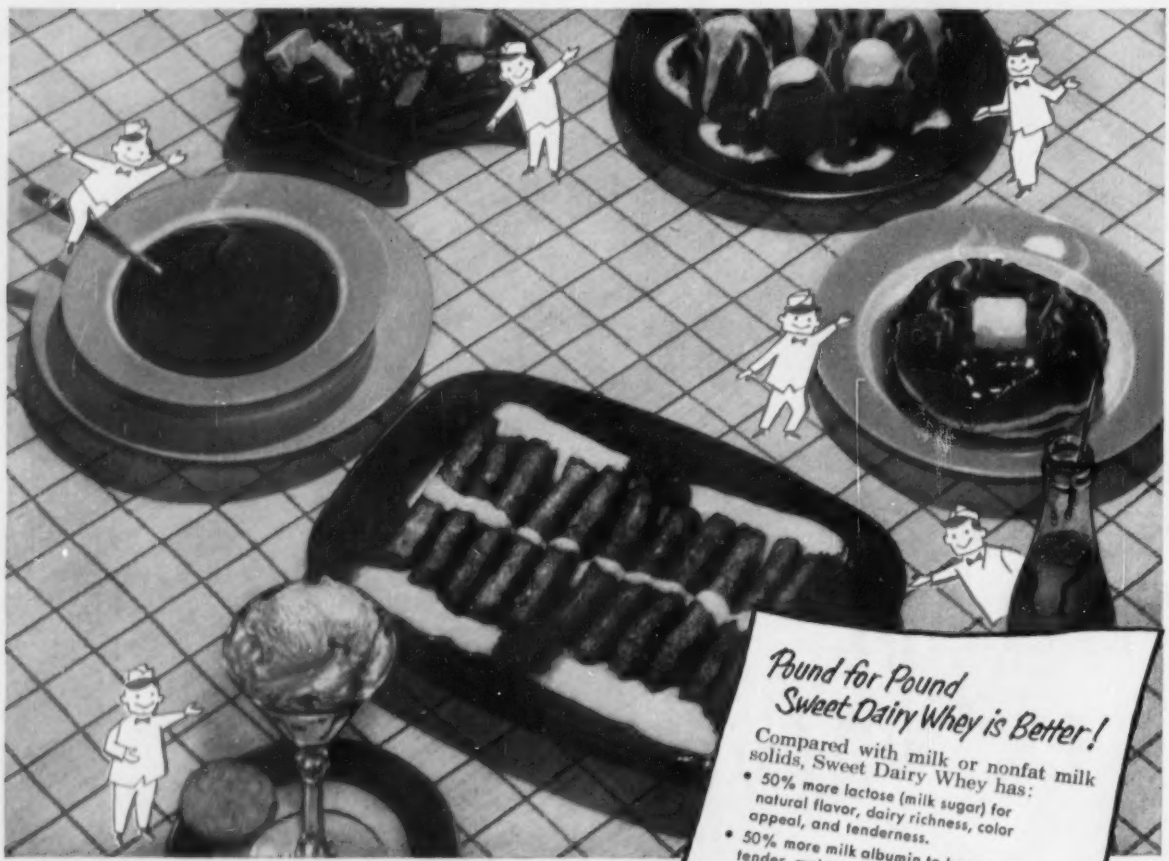
Candy — Sweet Dairy Whey preserves natural fresh flavor, texture and sweetness longer . . . provides superior eating qualities.

Cream-style foods — for smoother heavy-bodied cream soups and sauces with natural flavor. Improved reconstituting qualities.

Tomato soups — for greater heat stability, more original tomato taste and no separation before or after sterilization.

Prepared mixes and batters — for richer, golden-brown color, appealing milk flavor, and for tender, fluffy texture.

Soft drinks — for improving body characteristics in fruit juice type drinks . . . helps achieve proper "cloudiness" effect.



Pound for Pound Sweet Dairy Whey is Better!

Compared with milk or nonfat milk solids, Sweet Dairy Whey has:

- 50% more lactose (milk sugar) for natural flavor, dairy richness, color appeal, and tenderness.
- 50% more milk albumin to keep food tender, moist, fresh — longer.
- 25-50% lower cost . . . plus more of the essential milk constituents, more milk minerals and B-complex vitamins. And it's casein free!
- Uniform quality the year around. Prompt delivery.

Write Technical Service Department for additional information and working samples

Sweet Dairy Whey

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APPLETON, WISCONSIN
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32 plants coast-to-coast

Automatic Flow Regulator Controls Filtration Cycle

Filter efficiency reportedly is increased and product quality improved with use of an automatic flow regulator in the discharge line.

By compensating for increased resistance to filtration, unit (Type SA) is said to maintain constant flow at filter's rated capacity during the cycle. Therefore, operators are freed for other duties as the regulator eliminates need for manual pressure adjustments on pump side of filter.

Installation is termed simple since the self-contained unit requires only two connections. It has a 5:1 adjustable range and is designed to handle suspended solids without clogging. Vertical mounting and straight-through flow facilitate complete drainage after each cycle and aid washing. —*W. A. Kates Co., Deerfield, Ill.*

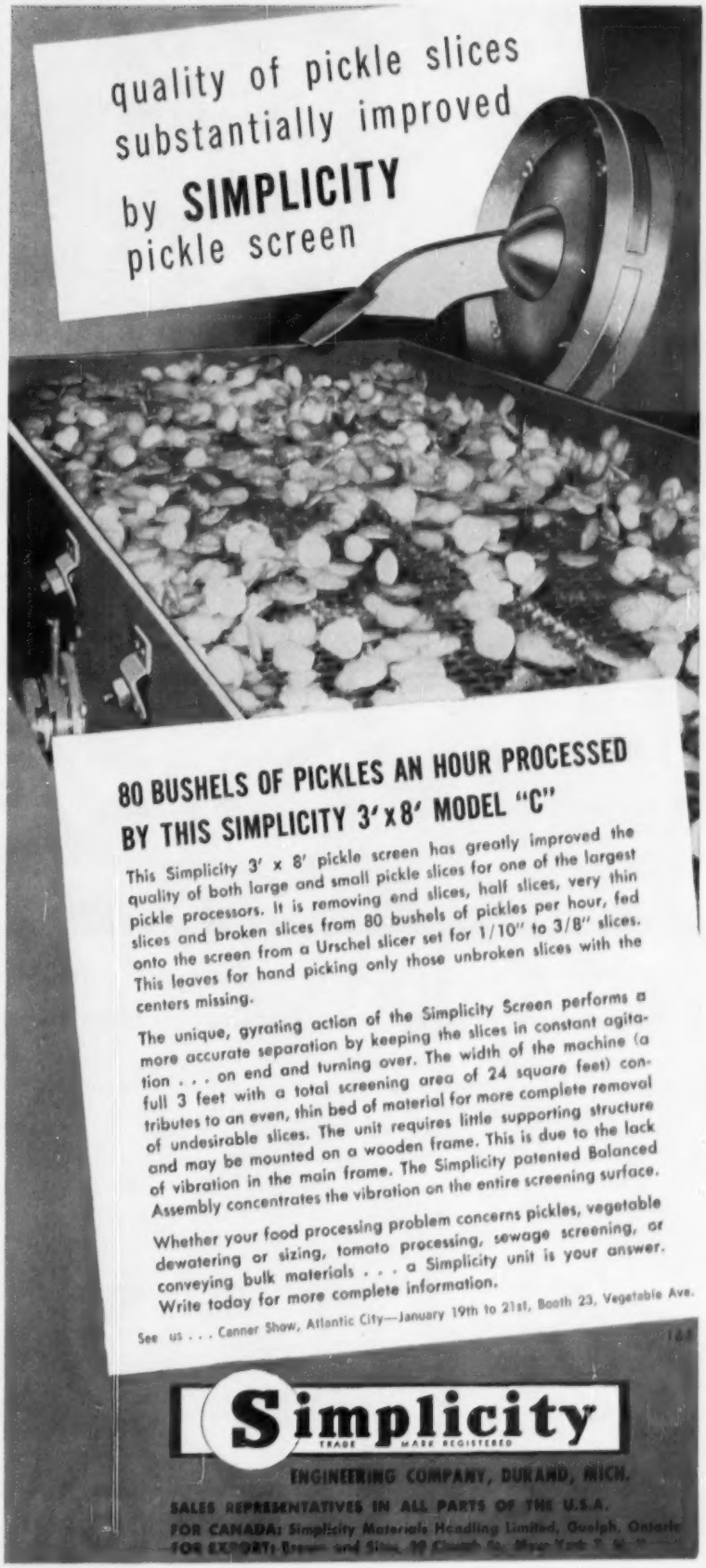
Circle 131A on Reader Service Card

New Bag-Making Method Ups Strength, Cuts Cost

Strength where it is most needed and a 5 to 15% cost reduction are said to result from a new principle of multi-wall bag construction. Structural strips are used to reinforce gusset areas and edges where greatest stress occurs.

Strips of kraft paper are placed between two walls of heavy-duty multiwall bags. Thus far, this principle has been applied commercially only to multiwall bags of five-and-six-ply construction. To simulate a five-ply unit, one strip is used in each gusset of a four-ply bag, thereby cutting the amount of paper in the package without sacrificing performance.

Same end results are obtained for



80 BUSHELS OF PICKLES AN HOUR PROCESSED BY THIS SIMPLICITY 3′ x 8′ MODEL "C"

This Simplicity 3′ x 8′ pickle screen has greatly improved the quality of both large and small pickle slices for one of the largest pickle processors. It is removing end slices, half slices, very thin slices and broken slices from 80 bushels of pickles per hour, fed onto the screen from a Urschel slicer set for 1/10″ to 3/8″ slices. This leaves for hand picking only those unbroken slices with the centers missing.

The unique, gyrating action of the Simplicity Screen performs a more accurate separation by keeping the slices in constant agitation . . . on end and turning over. The width of the machine (a full 3 feet with a total screening area of 24 square feet) contributes to an even, thin bed of material for more complete removal of undesirable slices. The unit requires little supporting structure and may be mounted on a wooden frame. This is due to the lack of vibration in the main frame. The Simplicity patented Balanced Assembly concentrates the vibration on the entire screening surface.

Whether your food processing problem concerns pickles, vegetable dewatering or sizing, tomato processing, sewage screening, or conveying bulk materials . . . a Simplicity unit is your answer. Write today for more complete information.

See us . . . Canner Show, Atlantic City—January 19th to 21st, Booth 23, Vegetable Ave.

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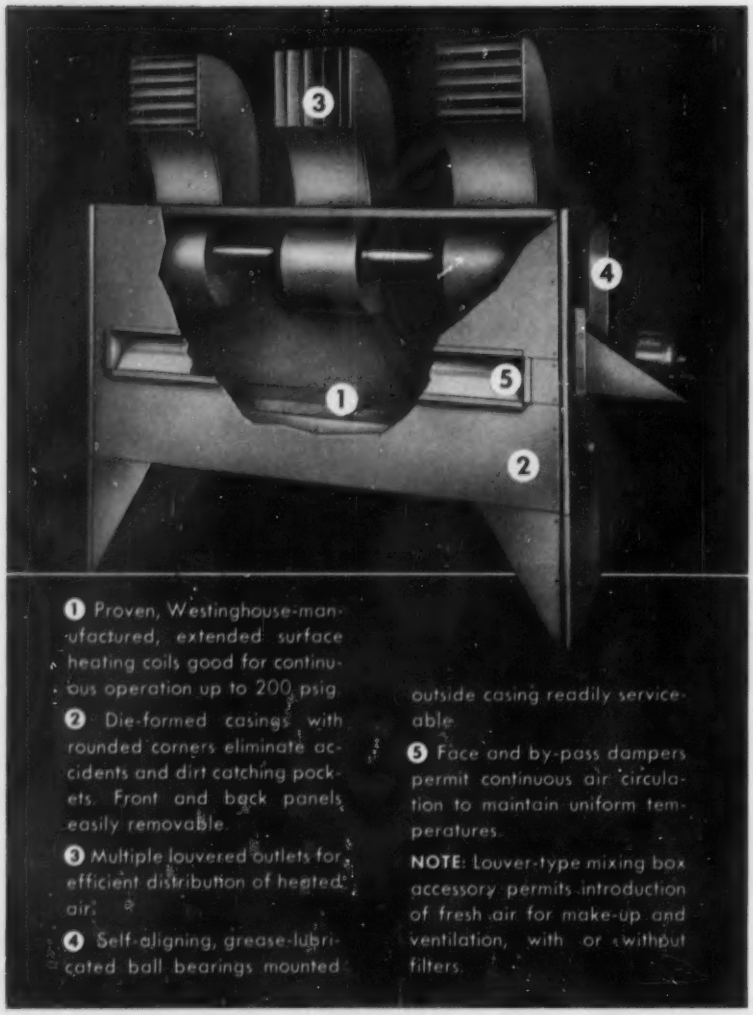

❶ Proven, Westinghouse-manufactured, extended surface heating coils good for continuous operation up to 200 psig.

❷ Die-formed casings with rounded corners eliminate accidents and dirt catching pockets. Front and back panels easily removable.

❸ Multiple louvered outlets for efficient distribution of heated air.

❹ Self-aligning, grease-lubricated ball bearings mounted outside casing readily serviceable.

❺ Face and by-pass dampers permit continuous air circulation to maintain uniform temperatures.

NOTE: Louver-type mixing box accessory permits introduction of fresh air for make-up and ventilation, with or without filters.

Westinghouse...The Unit Heater for General Purpose and Heavy Duty Industrial Heating

★ These rugged units available in 24 sizes, 8 coil selections, 150 ratings—from 100,000 to 2,500,000 BTU/hr., capacities from 2000 to 25,000 CFM each.

★ GENERAL PURPOSE HEATER . . . For manufacturing areas, warehouses, garages, commercial buildings —with standard non-ferrous heating coils.

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Equipment & Supplies

a six-ply unit by adding one set of strips to a five-ply bag. No gluing is required on valve bags, but strips are spot-pasted in sewn open-mouth bags to prevent shifting.

Laboratory and field tests are being continued with a wide range of other sizes and constructions to broaden this application.—*St. Regis Paper Co., 230 Park Ave., New York City 17.*

Circle 1318 on Reader Service Card

High-Capacity Softeners Have Backwash Control

A new line of packaged water softeners is designed with simplified connections to minimize installation time. A supply of high-capacity resinous exchange material (C-300, Hagan) is also provided.

Softeners (Model 250 H) consist of brine and softener tanks, with controls and piping in place. Twin units, which include two softener tanks with a single brine tank, are also available. With a "twin", one tank is always on stream as other is regenerated.

Flow rates up to 175 gpm. are possible with a single unit, or 350 gpm. for a twin. Capacities between regenerations range up to 1,500,000 gr. for a single unit and 3,000,000 gr. for a twin. A typical "hard water" may contain from 5 to 15 gr. per gal.

In the softener tank, resin rests over a bed of gravel. As raw water passes through, calcium and magnesium ions combine with exchange material to soften the water. When resin becomes saturated, it is quickly regenerated by use of ordinary salt solution drawn from the brine tank.

Each softener has a simple, automatic backwash controller that accurately maintains correct flow of water through the unit to prevent loss of resin. At the same time, it provides sufficient flow for adequate cleansing of the resin.

Fine-slot, non-clogging distributors made of brass are mounted near the

New pipe insulation has vaporproof and fireproof finish for fast application

One fast operation combines application and finishing when you use Armstrong LT Cork Covering on cold lines. This entirely new kind of insulation is made of cork segments adhered to an aluminum foil and asbestos paper backing that seals out moisture vapor and resists fire. Application is amazingly fast. The paper flap is cemented quickly into place and end joints sealed with a vaporproof tape. Fittings are insulated with Armstrong Plasticork® or field fabricated covers of LT Covering.

LT Cork Covering is only one of the quality products in the complete line of Armstrong Industrial Insulations. Armstrong also offers you a contracting service, geared to install these products economically and efficiently.

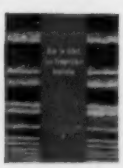
Send for free booklet on LT Cork Covering or for information on other Armstrong products that can help you solve your insulation problems.

Armstrong

INDUSTRIAL INSULATIONS

☐ Armstrong LT Cork Covering, a New Cold Line Insulation

☐ Armstrong Armaglas* Insulations for Low-Temperature Rooms



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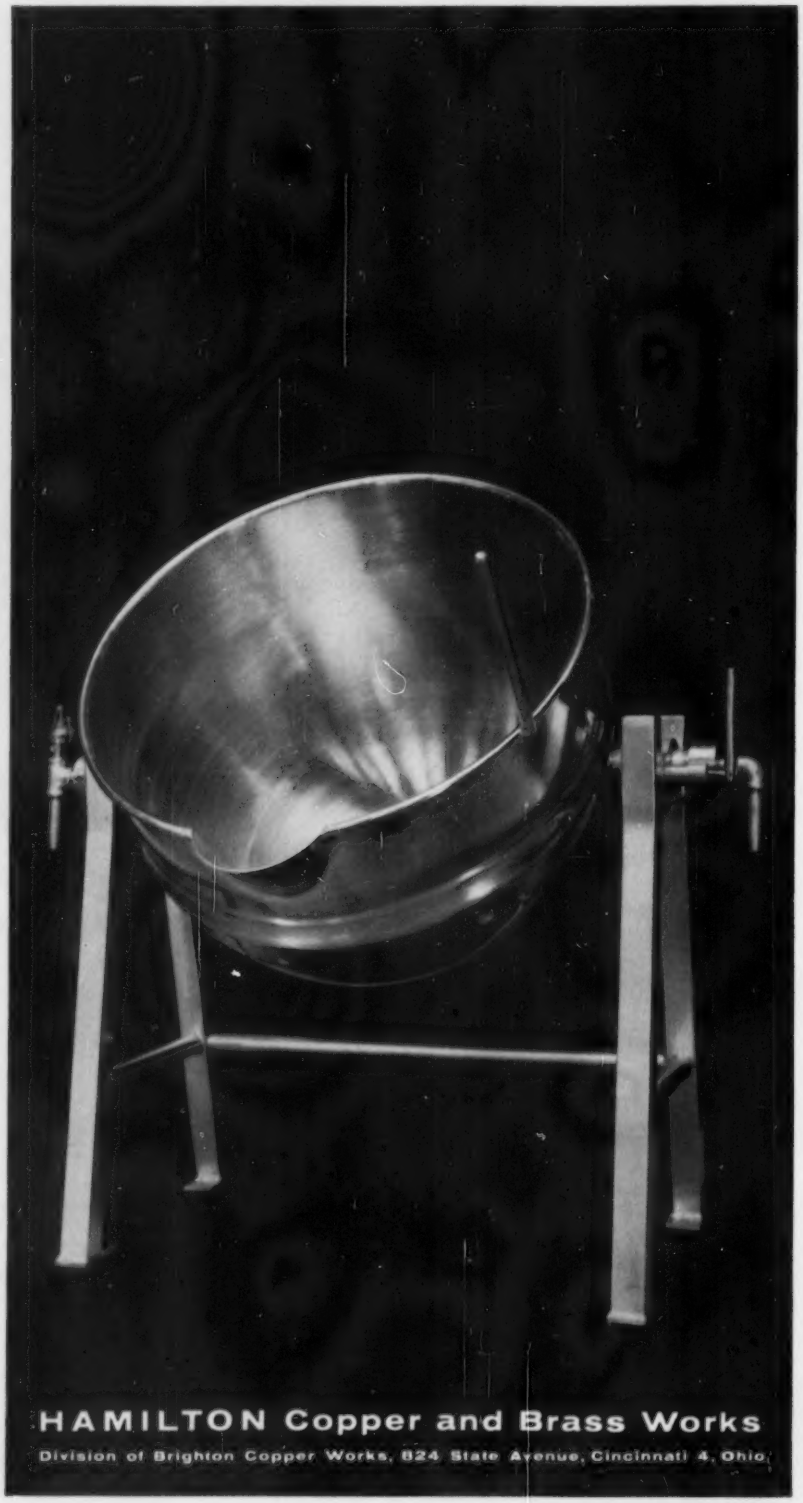
When You Need a Kettle Quick!



HAMILTON

New Style C *Tilting Kettle*

Demands for fast delivery pose no problem at Hamilton. Realizing that last minute changes in our customers' production schedules create an immediate need for additional equipment, we carry most of our standard kettles and mix cookers in stock—ready for prompt shipment.

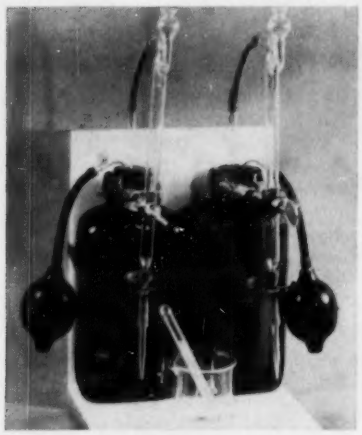
One of our standard items is the new Hamilton Style C Hand Tilting Kettle with positive-lock tilting device. Made of stainless steel, full two-thirds jacketed. 20 to 60 gallon capacities. Kettle design provides fast, even cooking. New streamlined leg construction gives maximum support and eliminates crevices where trouble-breeding dirt and food particles normally collect.

Other types of equipment readily available include mix cookers, pressure cookers, vacuum kettles. When you need a kettle *quick* call, wire or write Hamilton—for prompt estimate and delivery information.

Equipment & Supplies

tank bottom to provide even water flow, and to prevent loss of resin. A multiport valve and two pressure gages are included as standard equipment.—*Hagan Corp., 323 Fourth Ave., Pittsburgh 22.*

Circle 132A on Reader Service Card



Compact Kit Simplifies Pickle-Brine Testing

Acid and salt content of pickle brine may be quickly and accurately determined with a compact kit designed for use on the can line or in the laboratory.

In operation, a brine sample is titrated for acidity and then for salt. Also offered is a stirring rod which encloses titration end-point colors, thus provides accuracy. Kit is available from National Pickle Packers Assn., 202 S. Marion St., Oak Park, Ill.

Test procedure and color-standard rod are available without charge from —*Morton Salt Co., 120 South LaSalle St., Chicago 3.*

Circle 135A on Reader Service Card

New Ingredients

Pre-Cooked Thickener Is Cold-Water Soluble

Offered for use as a thickener in dry mixes and salad dressings is an arrowroot flour specially processed to impart desirable texture and spooning body. Applications include pie fillings and instant puddings, cake toppings, and icings.

Known as Pregelatinized Arrowroot Flour, it is pre-cooked for cold-water and milk solubility, drum-dried, then ground so that 90% passes through

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Canned Vegetables
Cereals
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In one half hour of cleaning time . . . one man and the Oakite Hot-Spray Unit . . . can make 12,000 square feet of grimy walls, greasy floors shine again. That's cleaning at its quickest!

What's more . . . you can wheel the Oakite Hot-Spray Unit up and down aisles and clean such equipment as retorts, tables, kettles, blanchers . . . RIGHT IN PLACE. That's convenience for you!

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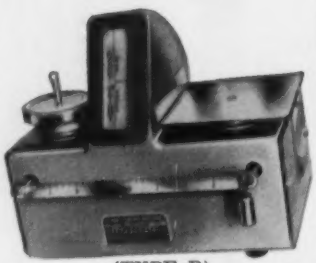
(TYPE A)

with fast and accurate "Shado-edge" indication

Provides precision weighing for every food processing operation. Indication projected by a beam of light eliminates parallax readings, weighs in out of level position.



(TYPE B)

TYPE A is designed for operations not requiring frequent change of weights—fully enclosed, only the commodity platter is exposed. TYPE B is recommended for frequent changing of weights and poise settings. "B" model has commodity and counter weight platters exposed. Beam and poise on outside of scale. Both "A" and "B" Shadograph models are available in end or center tower designs. Exact Weight Shadograph Scales are available in capacities for weighing from a few milligrams to 100 lbs.

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Equipment & Supplies

a 200-mesh screen. Product is also stable to fruit acids and neutral in flavor.—*Morningstar, Nicol, Inc.*, 630 *W. 51 St., New York City* 19.

Circle 135B on Reader Service Card

New Roquefort Flavor Has Wide Application

A new synthetic Roquefort flavor said to closely simulate flavor characteristics of the cheese, is now available for numerous specialty products.

Designated Roquefort Cheese Flavor Imitation 1780, it enhances the flavor of salad dressings, mayonnaise, baked goods, cocktail snacks, cheese spreads, and specialty vinegars. — *Synfleur Scientific Laboratories, Inc., Monticello, N. Y.*

Circle 136A on Reader Service Card

Briefs . . .

Infrared Moisture Balance saves time in determining moisture content of a variety of products by drying and weighing simultaneously. Readings can be estimated to 0.1%—*Central Scientific Co.*, 1700 *Irving Park Rd., Chicago* 13. (136B)

Redesigned HTST Controller provides greater dependability and simplicity in milk and ice-cream processing.—*Taylor Instrument Cos.*, 95 *Ames St., Rochester* 1, *N. Y.* (136C)

Air-Operated Cheese Cutter has interchangeable heads that handle all loaf sizes to 18 in. square or 18-in.-dia., and 14 in. thick.—*R. H. Strasbaugh Engineering Co.*, 10990 *Santa Fe Ave., Lynwood, Calif.* (136D)

New Trailer Refrigerator, 33% thinner than previous design, can be installed in high over-the-engine tractors, close-coupled trailers, or in conventional equipment. Unit has increased capacity and is more easily serviced. —*U. S. Thermo Control Co.*, 44 *S. 12th St., Minneapolis* 3. (136E)

Dual Stapler simultaneously closes top and bottom of carton after it is filled. Lightweight unit (477 lb.) handles average carton in about 3 sec.—*International Staple & Machinery Co.*, 801 *Herrin St., Herrin, Ill.* (136F)

Electronic Color Sorter, replacing hand-picking operations, rapidly segregates products according to quality grades. — *Separations Engineering Corp.*, 110 *E. 42nd St., New York City.* (136G)

They all taste better if you make 'em with '999'

Morton '999' Salt insures uniform flavor and quality in processed foods for two reasons:

1. Morton '999' is *guaranteed* always to contain more than 99.9% pure sodium chloride. The remaining 0.1% (or less) is a neutral inert sodium salt—and never bitter calcium or magnesium compounds.

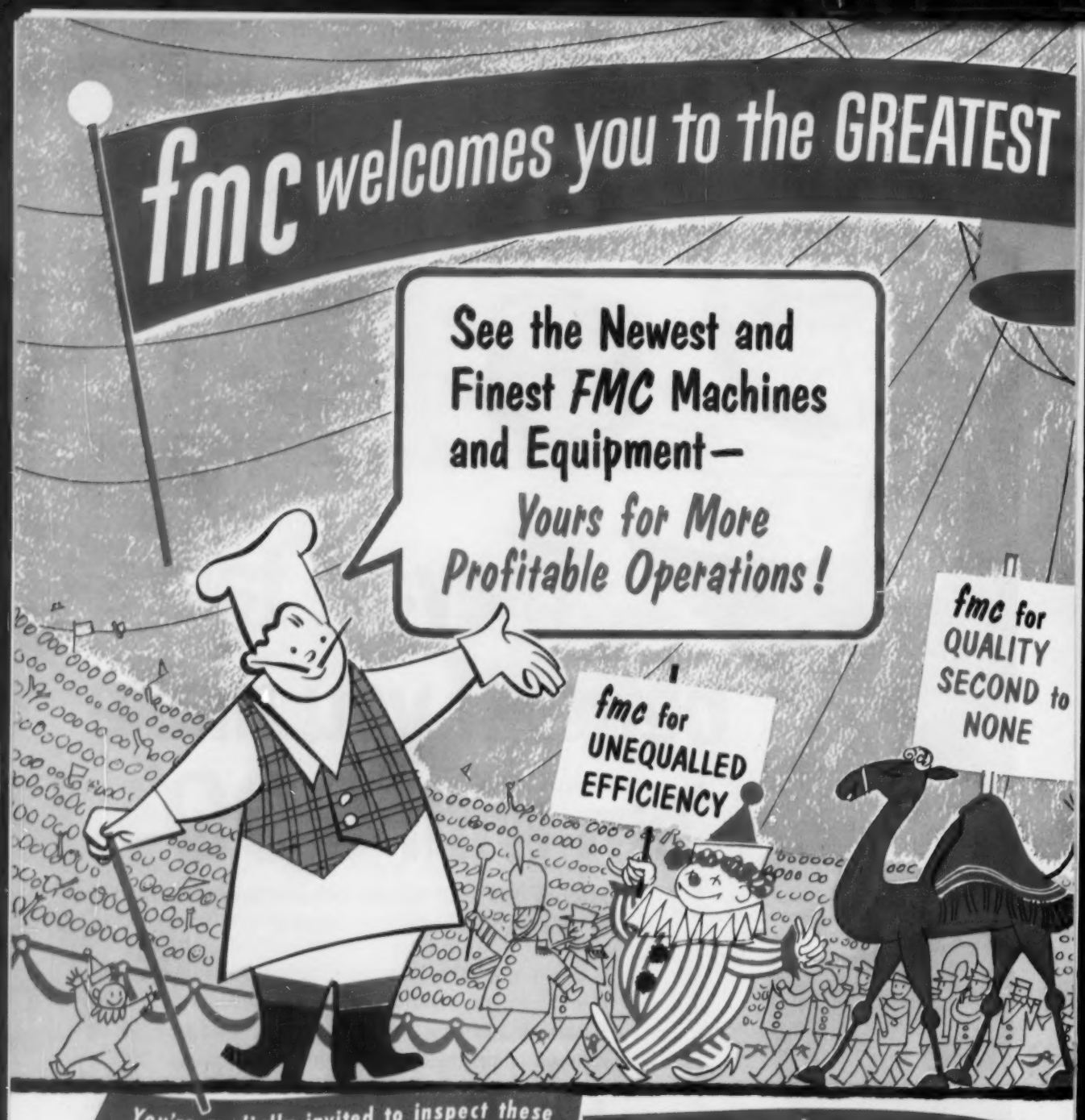
2. Morton '999' Salt is produced by vacuum pan evaporation to assure you a salt that is clean, free-flowing... evenly soluble. It has a more constant weight per volume ratio which insures more accurate salt measurement.

For more information about Morton '999' Salt—and about Morton service and technical help—write this week to:

MORTON SALT COMPANY

Industrial Division, Department E1-1

120 South La Salle Street, Chicago 3, Illinois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You're cordially invited to inspect these

Big Top Equipment Stars!

FMC Model 3A Corn Cutter

Nothing ever before like it! Cuts corn, cuts costs, greatly improves the product! No one responsible for processing corn for canning or freezing should miss seeing this sensational new cutter! You'll learn what high-speed ASD — Automatic Size Detection — really means!

FMC "STERILMATIC" Continuous Pressure Cooker and Cooler

One of the new FMC 3 shell "Sterilmatic" units will be shown at our booth — your chance to see what's being done in the most advanced processing lines of this type! FMC representatives will be on hand to answer all your questions on this and other FMC equipment.

...and many other FMC Stars including:

- "Sure-Way" Caser
- Carruthers Filler
- Non-Shock Caser
- 30-Pocket M&S Filler
- 20-Pocket M&S Filler
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- French Style Bean Slicer
- Telescoping Pocket Hand Pack Filler
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This year FMC is going to have one of the largest and most interesting displays it has ever had at a Canners Show. Of the more than 20 units to be shown, many will be shown for the first time. All of them are either new items for FMC, or incorporate new features that are sure to capture your attention. We hope you will be there to share in the activity and meet with us at our FMC booth. Welcome to FMC . . . and the Greatest Canners Show of them all!

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• Edited by GEORGE BLACK

ENGINEERING DATA BOOK

Another section of the new Cooper Alloy catalog being readied by the Valve and Fitting Division is now available. Referred to as "Stainless Steel Engineering Data," this 16 page manual includes a variety of tables and charts of reference value for those who work with stainless steel valves, fittings, pipe, tubing or castings. Your copy is waiting.

ADVANCED KNOW-HOW #1

The full story behind the Shellcast® stainless steel jet engine support rings being turned out by the Foundry Products Division of Cooper Alloy is told in Advanced Know-How Report #1. The problem, the specifications and the solution are covered in detail with text and photos. Write for your copy.

PUMPING ETCH ROOM SOLUTIONS

Transferring acids and salt solutions used in the Etch Room of Litho Chemical & Supply Co. caused repeated pump failure and constant shaft seal maintenance. Five years ago a Vanton plastic pump (no stuffing box, no shaft seals) was put into daily service. Customer reports "no maintenance except lubrication." Full story appeared in Chemical Processing (July). Reprint available on request.

QUIKUPL DATA POPULAR

Since the publication of the May issue of Newscast which featured this patented fitting, the requests for additional data have been pouring in. In case you missed the issue, may we remind you that copies are still available. Full engineering data, case histories and photographs are included, making it possible for you to see for yourself just how this unique stainless steel fitting can cut your installation and operating costs.

COOPER ALLOY
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Chocolate in Milk

—Continued from page 65

mentation also tends to minimize fat separation.

Many beverage bottlers, however, prefer to accomplish this by using low-fat cocoas. While this may eliminate the separation problem, defatted cocoa has a low-quality flavor—and contains almost none of the delicate characteristics of good chocolate.

Further, a truly low-fat cocoa can be obtained only by chemical extraction of the cocoa butter. The limit that can be obtained by hydraulic expression is about 6%. And most manufacturers do not find it practical to produce a product with fat content below 10-12%.

To understand the basic trouble, it should be noted that cocoa matter has a high affinity for water—which results in displacement of the cocoa butter from the chocolate particle. This occurs particularly under warm conditions. For cocoa butter melts at 91-92 F., and as long as it is liquid the transfer will continue.

Thus, sterilization, and particularly storage of bottles without cooling, will accelerate fat separation.

The only practical means by which a bottler may avoid this problem is to homogenize the finished beverage prior to bottle filling.

Here, a plus-benefit results: Homogenization produces a mellower, richer flavor because of uniform fat dispersal.

Sterilization involves heating the product within the container to about 240 F. for 15-20 min. Frequently, a rotary-type sterilizer is used. Actually, beverage within the bottle is at this temperature for only a short time because of the slow rate of heat transmission.

Nevertheless, the process is very severe, and use of low-quality, high-acid milk powders or fluid milks will lead to trouble.

Sanitation Pointers

Many difficulties in processing can be traced to yeast, mold, and bacterial contamination—which stems from faulty sanitation.

Also, bottlers of carbonated beverages who use the same filling devices for chocolate milk must clean their fillers scrupulously—because a minute quantity of carbon dioxide gas, if incorporated into the chocolate beverage, causes curdling or coagulation when milk is subjected to the sterilizing process.

Raw materials should always be carefully examined by the quality control department. A product that may appear very fine on a 100-mesh screen may be proved very coarse by a 200-mesh.

Such cocoas can and do cause serious troubles in preparing the milks.

End (Resume reading on page 66)

Food in Plastic Bags

—Continued from page 93

good seal was impossible to obtain.

Bags were heat processed in a special water-and-air super-imposing retort (see photo and drawing) at 250 F. for 25 min. And when the sterilizing cycle was completed, packages and contents were lowered to about 100 deg. Super-imposed air pressure (at 32 psig.) was held in the retort throughout the entire operation.

Reason for using this type of retort is that bags are subject to increased internal pressure—through expansion of gases and vapors in the container—during steam sterilizing.

When processed in conventional steam-heated retorts, sacks burst along the seams.

Even if bag seams are vastly improved, it appears desirable to continue use of this type of retort. For when packages are processed in this unit, under about 32 psig. air pressure, there is almost no strain on the package. And heat transfer is undoubtedly improved—especially in viscous food products—because miniature gas and vapor bubbles are kept from expanding throughout the product. Such expansion reduces heat transfer.

Heat penetration to the center of the bags was measured by a standard thermocouple. It was sealed in a plastic bag in a manner similar to that used for metal cans (see photo). A cylinder made from wire screen was used to hold the bag in a nearly cylindrical shape during tests.

Another thermocouple measured retort temperature. And comparison of container-center and retort figures gave information on time lag for bag center to rise to processing temperature (see graph).

Bags used for the study were roughly of 2½ in. dia. But it was difficult to keep the flexible sacks in a perfectly cylindrical shape, so heat penetration figures furnish only approximate data.

In actual practice, however, the non-cylindrical shape markedly reduces one center distance in the package—and this in turn shortens time needed to bring bag contents up to retort temperature.

It required 9-10 min. in the tests for central temperature of potato-meat product in Mylar A 300 to reach 248-250 F., and 11-12 min. for Trithene

1849

At the time of the Great California Gold Rush, whiskey bottles embossed with symbolical or historical designs were greatly favored. These early-day "commercial" glass containers were crudely molded, and often merely broken away from the blow-pipe at the neck, the rims brought to a relative smoothness by reheating.

Today's demands include truly distinctive packaging *plus* precision craftsmanship... good reasons to call on Metro's experience in design and production of special glass containers... whether introducing a new product, or to enhance the appeal of an accepted brand. Good reasons, also, to specify METROmatic service—for quality glass containers, delivered on an unfailing schedule, geared to your production requirements.

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A 400. Of this time, 5 min. was needed to raise temperature of retort to 250 F.

Thus, only 4-7 extra minutes were required to bring film contents up to final retort temperature. And while heat transfer is slower in plastics than it is in metal cans, it is still so fast that the factor can be forgotten when weighing plastics as a packaging material for heat-processed foods.

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End (Resume reading on page 95)

Meat Packers Meet

—Continued from page 90

—Prompt, accurate figures by Tuesday of the following week.

—Curbing of unsatisfactory conditions almost as soon as they originate.

—Elimination of estimated figures which do not tie into the books.

—A guide to buying, selling, and expenditures on a weekly basis, which eliminates waiting for 5 or 6-week figures.

—Condensed, to the point, data.

Weekly product-analysis reports provide production figures, inventories for comparison with sales, yields, shrinks or gains, and material profits.

Future Meat Supplies

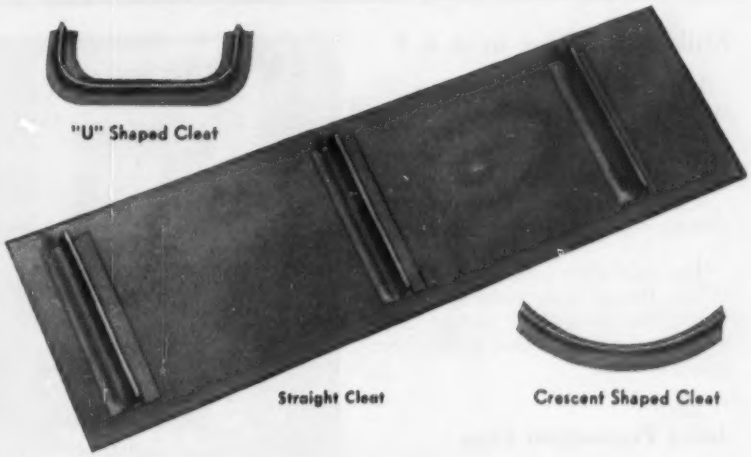
If present marketing conditions hold —and there are as yet no strong factors indicating a change—slaughter of cattle and calves in '56 will be close to the '55 figure of 40 million head, predicted J. R. Ives of A. M. I., Chicago.

Despite the sharp decline in hog prices, no substantial cutback in next year's production is expected. According to the USDA quarterly pig-crop report, breeding intentions in nine major states for Dec.-Feb. are down only 2%.

Thus, an increase in total meat production is anticipated for '56—to about 27.2 billion lb., or slightly above the '55 record figure of 26.8 billion lb.

End (Resume reading on page 92)

elevation + sanitation !



GLOBE flush-cleated NEOPRENE belting

Flush-cleated to the top surface of the belt — and formed so that there is no possibility of granular or powdered particles becoming embedded! Sturdy, odorless, tasteless, non-toxic neoprene, embedded and vulcanized into the neoprene belting to assure maximum sanitation with full carrying capacity on inclines.

Finest quality Globe belting with multiple layers of hard-woven light duck, vulcanized together with neoprene rubber between plies . . . plus a ¼-inch smooth cover on carrying side and friction surface on the pulley side. White or black . . . now with self cleats in a choice of three shapes.

Crescent or V-shaped to retain material and prevent side spillage of granular materials or straight cleats for package or bulk conveying on inclines.

Available in ¾" and 1½" heights, widths up to 48", spaced at any required distance.

GLOBE CLEATS ARE ALSO AVAILABLE ON

KANRY-TEX BELTING treated with special latex compound impregnated into fibers of the belt . . . developed especially for food, fruit and vegetable conveying. Also available on stitched canvas or solid woven cotton belting.

Manufacturers of

White Solid Woven Cotton Belting — Woven Endless Belts — Webbings
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NEW PACKAGES & PRODUCTS

Milk and Coffee at A & P

Instant coffee and dry milk solids are being marketed by Great Atlantic and Pacific Tea Co., New York City. Products are distributed through the company's super markets.

The coffee is packed in 2- and 6-oz. wide-mouthed jars under the A & P label.

The non-fat dry milk solids have the White House label. Soluble in cold water, the product is packed in a 9 6/10-oz. container that makes three quarts of milk.

Joint Promotion Plan

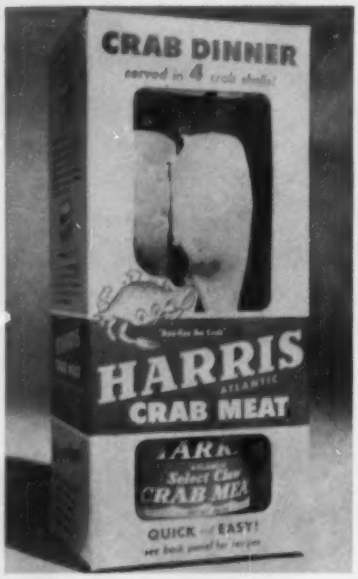
A unique mass sampling and promotion plan linking two products of different companies has been announced by Morton Salt Co. and Pillsbury Mills. Four million 4-oz. Morton Salters will be inserted in 2-lb. packages of Pillsbury's Best Flour.

The salt sample will be a premium for the flour purchaser and will help acquaint the consumer with the disposable shakers. The salters are packed in a tubular case of corrugated paper before inserting them in the flour.

Butterscotch Cake Mix

Fifth member of the Swans Down cake mix family is butterscotch. Reported to be the first of its kind, it is mixed in one step in three minutes. Fresh eggs and water are added.

Packaged in a 19-oz. carton, the mix is made up of sugar, flour, shortening, non-fat dry milk solids, emulsifier, baking powder, dextrose, salt, artificial and natural flavor, and artificial color.



Crab on the Half Shell

Four crab meat shells and a 5½-oz. can of crab meat make up an unusual crab dinner packed by Blue Channel Corp., Port Royal, South Carolina. The pink shells are used as serving dishes for the meat.

Package for the dinner is the result of years of experimentation by the processor. The problem was to get the delicate shells to the housewife intact. Solution proved to be a notched cardboard frame suspending each shell within the carton. The shells are held securely in place, yet are visible through two windows in the carton.

Carton was developed by Atlanta Paper Co.

Saran Food Tubes

A single-use plastic packaging unit is being offered to food processors by Unette Corp., New York City. Made of thin extruded Saran, the tubes are manufactured in about 30 sizes, from .3 to 6 cc.

Pliable and transparent, tubes may be used as single-service or sampling devices for condiments, liquid teas and coffees, oils, syrups, soft drink essences, and extracts.

The tubes are filled on a machine developed by the manufacturer and sealed with a compound engineered to the individual product. Stopper is designed to break under specific "burst pressure". The pressure is adjusted to the product being filled.

Also designed by the company is an applicator tube, of little interest to food processors.

Circle 164B on Reader Service Card

Octagonal Cake Package

Latest Sara Lee product to reach Chicago markets is a chocolate cake which took two years to develop. Baked and sold in an eight-sided aluminum foil pan, the cake is made with Dutch chocolate, 93 score butter, and fresh eggs.

The unusual octagon pan developed by the processor not only allows ready stacking for display purposes, but provides a guide for cutting cake. Net weight is 1 lb. 2 oz.

Streamlined Pork Chops

Directed at rising consumer interest in low-calorie, high-protein foods, leaner and meatier pork cuts are being packed by Swift & Co. An added feature is the economy to the consumer in providing more meat per lb.

Fresh pork loins and shoulder butts with fat trimmed to ¼ in. are being produced at all Swift plants. This is the minimum needed to guard against dryness when the meat is cooked.

The move parallels a similar new

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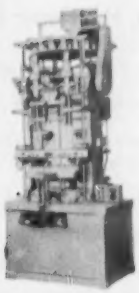
Royal
INSTANT COCOA
NET WEIGHT - 1-1/16 OZ.
INGREDIENTS: SUGAR, DEXTROSE, COCOA, NONFAT DRY MILK SOLIDS, SALT, ARTIFICIAL FLAVOR
MANUFACTURED BY
STANDARD BRANDS INCORPORATED
NEW YORK, N. Y.

ROYAL INSTANT COCOA IS NOW PROTECTED BY ENVELOPE OF LAMINATED SNOPAQUE GLASSINE, HEAT-SEAL COATED AND PRINTED BY RIEGEL.



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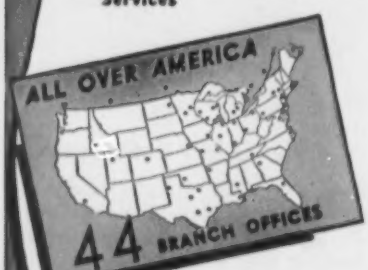

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KLENZADE PRODUCTS, Inc.
BELOIT, WISCONSIN

style in smoked cured meats, particularly the "new look" in Swift hams. Here there is a minimum amount of fat and greater trimming of shank skin.

New Bread Mix

Homemade bread—a novelty in the modern kitchen—has become a reality with the introduction of Spruance Co.'s Old Fashioned Bread Mix. Only warm water and yeast are added to the product to make as many as 4 1-lb. loaves.

Containing flour, dry skim milk, sugar, shortening, salt, malt, and yeast, the mix is packaged in a heavy-duty calendered-stock bag lined with laminated glassine. Material protects the contents from grease seepage, air and moisture deterioration, and prevents caking.

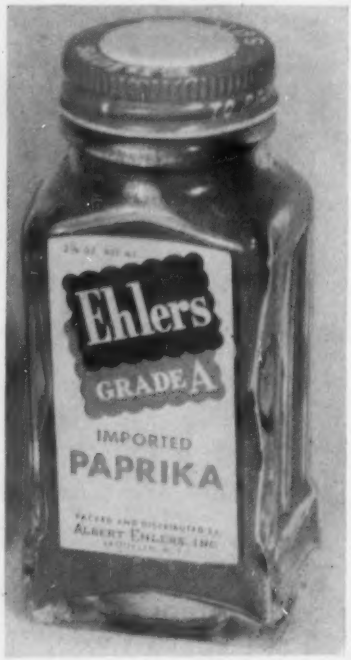
Originally designed for institutional use, the mix is now being retailed in New England and the Midwest.

Low Calorie Milk Shake

Redi-Magic Milk Shake, a nutritive, but low-calorie beverage powder, is now being distributed nationally by Redi-Magic Milk Shake Mix Co., Los Angeles.

Made of egg solids, protein, and milk solids, it comes in four flavors: chocolate, strawberry, vanilla, and cherry. Mixed with regular or skim milk, it makes a drink that contains as little as 200 calories—about one sixth the amount found in fountain milk shakes.

The mix can also be used in frostings, desserts, and on cereals.



King Size Spice Jars

Albert Ehlers, Inc., has introduced a king size series of spice jars. These retain the distinctive square shape of the smaller jars. An indented bottom permits handy stacking.

A red, green, and yellow label has been adopted for the Italian style spices packed by the processor. Other spices keep the standard red, white, and blue label.

Fine Portion Control For Frozen Fish

Portion control to the decimal is reported possible with fish servings thanks to a new cutlet created by the Cold Water Seafood Corp. of New York City.

Called Uni-Portion, the institutional product is a precisely fabricated, 4-oz. block cut from the tender muscle meat of fresh jumbo cod and haddock. Cutlets are uncooked. Haddock is offered breaded and unbreaded, cod breaded only.

Specially designed for mass feeding where portion control costs are an

important factor, Uni-Portion products are packed 20 cutlets to the package. Stacked in five layers, the cutlets are separated by fine parchment to prevent cutlets from freezing together.

Packages are overwrapped with a three-color wax wrapper containing basic cooking instructions. Six packages are packed in each 30-lb. case. Package features the Icelandic label.

Mints With a Message

Tasty peppermints imprinted with company names or sales messages are being manufactured by Personalized Mints Service, Chicago. Slightly over ¾ in. by ½ in. in size, the mints are made with a message embossed on each side.

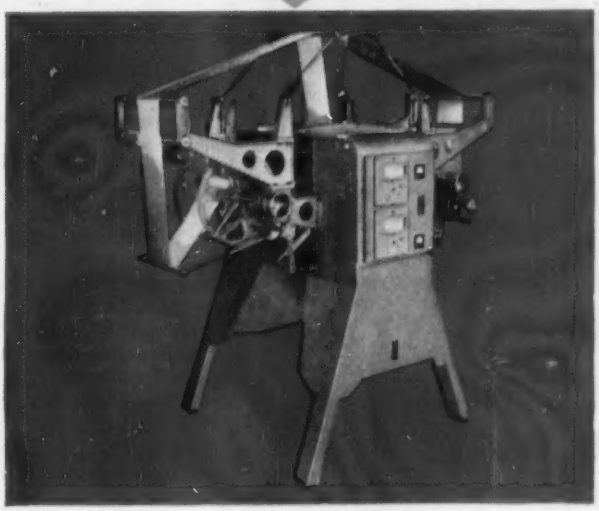
Directed at companies interested in a goodwill or advertising item, particularly in the food service or catering field, the mints are sold loose or in cellophane-wrapped packages.

Cellulose Band Tearstrip

A tearstrip incorporated in seals manufactured by Celon Co., Madison, Wis., permits easy removal of cellulose bands on glass packages. Perforations circle the band where the skirt of the cap and the glass meet. At the end of the perforations is a small tab. A pull on this removes a

Packaging

LIQUIDS
SOLIDS
POWDERS
direct from roll stock



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LOW CAPITAL INVESTMENT — simplicity — versatility and TREMENDOUS SPEED! A *single* Bell-Pak Machine with variable speed drive . . . handles an untold variety of products and package sizes . . . with any standard filling equipment. Automatically-controlled heat sealing — Electric Eye registration — unskilled supervision. For complete information, send us your product — your package — your problem.

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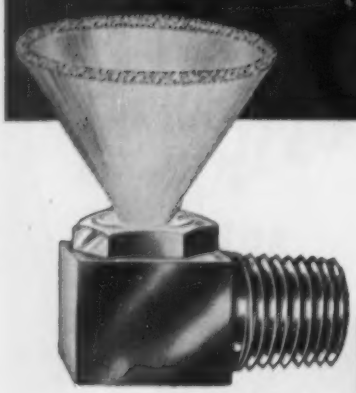
LESS CLOGGING WITH Monarch



"Any impurities small enough to pass through the orifice of this Fig. 629 nozzle will never clog the single large internal feed hole.

Monarch offers a full line of efficient, dependable, advanced design nozzles to . . . . "

- WAX FRUITS
- RINSE VEGETABLES
- POWDER MILK
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- WASH FILTER CAKE
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Remember . . .

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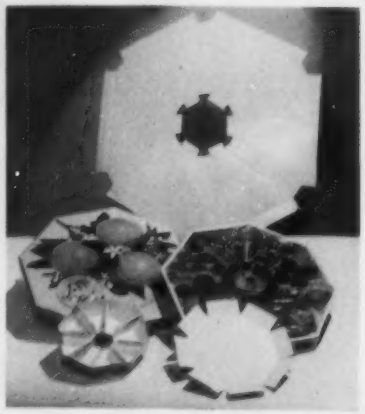
strip around the band, separating it.

With the tearstrip, the entire seal need no longer be removed. Sales slogans imprinted on the band therefore remain in view for the life of the bottle.

Circle 148A on Reader Service Card



Poly' Coated Board

White polyethylene coated board made by Gair Cartons Div., Robert Gair Co., is being used for two bright new cartons. Made of polyethylene impregnated with particles of titanium and extruded on paperboard, the material offers a glossy white surface as well as grease- and moisture-resistant qualities.

Drake Bakeries Inc., Brooklyn, uses the board for its coffee ring cartons. The material prevents staining of the package and keeps the product fresh. It is used for the bottom tray.

The material is used to make separators (photo) for Mission Pak Co.'s glazed candy fruits. The Los Angeles processor's products are packed in corrugated containers. The separator is die-cut and creased.

Circle 148B on Reader Service Card

AMI Show Highlights

Among new products and packaging ideas spotted at the recent American Meat Institute convention in Chicago:

Swissettes, a seasoned blend of veal and pork, were exhibited by Basic Food Materials, Vermilion, O.

Wiener'n Bun, All-in-One is a package of six all-meat frankfurters in buns. Packaged frozen by Krey Package Co., St. Louis, the wieners are browned and served.

Jane Wilson has added five canned casserole dishes: scalloped potatoes with cheese, chicken fricassee with vegetables, beef pie, chicken pie, and turkey pie.

Breakfast Bologna was shown by Tarnow Food Delicacies, Tampa. Eight 1-oz. slices offer an economical breakfast meat.

Stark & Wetzel, Indianapolis, displayed a combination 4-oz. package of sliced ham and processed cheese. Package is cellophane and polyethylene vacuum pouch.

Ham and Cheese Sticks, frozen, were shown by Albert F. Goetze, Inc., Baltimore. Precooked and breaded, the sticks are heated and served. Same processor offered creamed chipped beef in a 10½-oz. package.

Standard Packaging booth featured a mylar-polyethylene laminated film.

Boston Sausage and Provision Co. exhibited cooked corned beef in a 4-oz. film pouch.

Meat in Pot-Pie Tins

Ready to heat and serve are three items in the Wilson & Co.'s Jane Wilson line—Salisbury steak, Swiss steak, and ham and potatoes au gratin. Packed in pie-shaped 1-lb. cans, the products serve 2-3 people.

Since the pot-pie tin is not as thick and similar meat items are packed, the retort processing time halved.

Each can is packaged in a cardboard collar that facilitates mass display. The cans will not slide and the collars provide more label surface.

Frozen Turkey Parts

Fox DeLuxe Foods has introduced a line of fresh frozen turkey parts, sealed in plastic bags. Breasts, legs (drumstick and thigh) and wings are packed.

A turkey leg packed by the company weights 3-3¾ lbs. and will serve from 5-6 people. Wings are packaged in pairs.

36 Eggs in One Basket

In keeping with the trend toward larger consumer units of staple foods, Bloomer Bros, Newark, N. Y. has introduced a 3 doz. egg carton. The flat, compact package provides a week's supply of eggs for a large family.

New Product Shorts

Angel Fluff frosting mix has been added to General Mills' Betty Crocker line. Housewife adds boiling water, blends, and beats for enough frosting for a large, two-layer cake. A date bar mix has also been introduced.

Southern Style Souse is being distributed in Michigan, Ohio, and Pennsylvania by Crayton Products, Inc., Cleveland.

Ac'cent MSG is being used in Claridge Food Co.'s instant canned hamburger for added flavor. Hamburger itself is double ground for extra tenderness.

Larger bottle for it's dietetic beverages is Cott Corp.'s answer to larger-bottle competition in New York, Ohio, and Chicago areas. Bottle holds 16 oz. instead of former 12 oz.

Frozen Chicken Cacciatora is processed by Perona Farms. Package includes a half chicken in three pieces, serving of spaghetti and sauce in a foil dish.

Tender Thin Cocoanut Flakes are being retailed by General Foods Corp. under its Baker label.

Frozen Macaroni and Cheese is a new product of Holloway House.

Handy Tearstrip has been added to General Mills' Cherrios package. Neater opening allows housewife to easily roll or unroll the wax liner.

In Experimental Stage at Minute Maid are frozen chocolate milk concentrate, frozen french chocolate milk concentrate, frozen french fried potatoes, and frozen potato patties.

Combination Pack of liversausage in a Saran tube and slices of bologna is packed in one carton by Oscar Mayer.

New Institutional Cereal is Post Sugar Krinkles. The pre-sweetened rice cereal is made by General Foods.

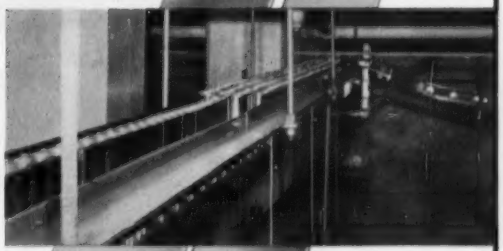
Two New Papers from Crown Zellerbach Corp. are polyethylene and kraft bags (used for popcorn) and Loczin, a freezer paper.

Pastry and Filling for a fruit pie are packaged in a 2-can combination marketed by Northland Foods, Inc., Duluth. Called "Pi-Mix" Ins., the product is made in apple, cherry, French apple, blueberry, and raisin.

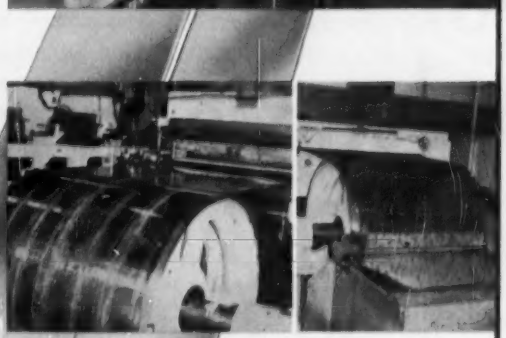
Fresh Frozen Mangos are to appear in Hawaii after development by staff of University of Hawaii.

A CONVEYOR BELT OF SOLID STEEL

is behind these Sandvik service records



Over 150 million cans of Hershey's chocolate syrup have been carried by this Sandvik steel belt conveyor.



More than 8 years of round-the-clock unattended operation is the performance to date of this Sandvik steel belt conveyor being used in producing Nestle's Semi-Sweet Chocolate Morsels at Fulton, N. Y.

Sandvik belts used for similar applications in other companies have been operating successfully for over 15 years.

Here are two samples of the kind of long-lived, trouble-free conveying you can get from a Sandvik steel belt conveyor.

In addition to inherent stamina, the stainless or carbon steel belt gives you a smooth, flat, tasteless and easy-to-keep-sterile surface.

Sandvik builds complete conveyors for a wide variety of food-handling applications. Belts can be of any length or width.

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ACRONIZE does not change processing routine!

ACRONIZE expands your market, brings profitable new business to you!

ACRONIZE*

Chlortetracycline

The big news in poultry is ACRONIZE! This amazing new product retards the growth of bacteria that cause poultry to lose freshness. It was developed after long testing by American Cyanamid Company, one of the world's major chemical and pharmaceutical firms.

THINK WHAT THIS MEANS! Now you can ship farther, and retailers can order *more* of your poultry for weekends and holidays with confidence that it will remain fresh much longer. ACRONIZE is just what your customers have been waiting for!

NO "EXTRAS" TO BUY! You'll be amazed at the simplicity of the ACRONIZE Process. You follow your *regular* routine; just add a pre-measured packet of powdered ACRONIZE to the water in the chill tank. *That's all!* After chilling, birds are completely processed, and bacterial growth is retarded!

NATIONAL ADVERTISING & PUBLICITY! ACRONIZE will be featured in newspapers and magazines, on TV and radio — to inform America's shoppers about this new standard of poultry freshness. Women will be asking retailers about it; retailers will be asking *you* about it.

GET THE WHOLE STORY NOW! Let one of our representatives show you why ACRONIZE really is "... a history-making advance in poultry processing and distribution!" For further information contact:

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Full 3½" Dial Face

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THERMOMETERS, INC.

Norwood Ave., Cincinnati 12, Ohio

Mfrs. of Industrial Laboratory Recording and Dial Thermometers

New Can Handling

—*Continued from page 51*

and plant power supply. Tractor is unhitched and driver picks up an empty trailer and returns to the can factory.

Can handling operator then throws a switch to energize the particular circuit being used—and the trailer begins to unload itself. From this point, movement of trailer lining and conveyor is actuated by a system of switches which are, in turn, actuated by the demand for cans at the filler.

One man is in charge of this entire operation. He makes the initial electrical connection at the trailer and, from then on, his activities are limited to inspection of cans, clearing of occasional jams, returning of trailer lining to body, and assisting truck drivers in spotting trailers.

Speed with which the trailer can be unloaded is limited by requirement for cans. The unscrambler has a design speed of 150 per min. per lane. It can be purchased with almost any desired number of lanes.

Minute Maid employs 4- and 6-lane units. The 4-lane machine is designed for 600 cans/min. With 6-oz. orange concentrate cans, however, this unit has delivered as many as 800 cans/min. to the filling machines, and operates regularly at 700 per min. The 6-lane machine is capable of speeds between 1,000 and 1,100.

Above feature is based on a talk by B. M. Middlebrooks, Minute Maid Corp., at the recent special conference on automation of American Management Assn., New York City, and personal observations by FE Senior Associate Editor A. V. Gemmill at Minute Maid plants in Florida.

End *(Resume reading on page 52)*

Curbing Peroxidase

—*Continued from page 53*

points obtained by testing two or more samples. Points showing trace activity appear to lie between two parallel lines with a "z" value of 48 F. and an F_o between 4 and 6 min. A typical bacterial thermal-death-time curve having an F_o of 10 and a "z" value of 18 F. is included.

The thermal inactivation curve for pea peroxidase (amount of heat required for an activity assay below 0.1% of original activity) shows an F_o of 6 min. and a "z" value of 48 F.

Data in Fig. 1 are based on samples heated with a time lag of 6 sec. or less. Thus, they may not be applicable to products processed as discrete particles due to the heat-penetration lag for a particle such as a pea.

However, these data do apply to products processed in heat exchangers or as a homogeneous body.

That no activity was found immediately after heating, whereas it was measurable on storage, indicates enzyme regeneration.

Below 100 C

In this case, thermal destruction of peroxidase was determined by rate-of-destruction techniques often used in bacterial work. Values resulting from simultaneous treatment of six 0.03-ml. samples of enzyme extract for different time intervals at 80, 90, and 100 C. are presented in our lead illustrations.

If we assume a first order reaction over all concentrations of the enzyme, the curve obtained may be extrapolated to any level of activity and the corresponding time observed. Fig. 2 is included as a sample of types of data used for curve calculations.

An interesting property of peroxidase is its extreme power of regeneration as shown in our table. Most references cite regeneration below 100 C. But above this temperature it was found to be even more pronounced, occurring within a heating time of 6 sec. at 110 deg. C. (230 F.) if activity was assayed without storage. At 110 C., storage for 48 hr. revealed an activity of 64% of the original unheated preparation, while 24 sec. at 110 C. showed 9% and 17% of original activity after 24 and 48 hr., respectively.

Heating samples at 130 C. (266 F.) for 36 sec. reduced activity to 6% after 24- and 48-hr. storage, while in 5 days activity had increased to 10% of the original preparation.

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The above feature is an abstract of Contribution No. 270, Department of Food Technology, Massachusetts Institute of Technology, Cambridge, initially taken from the thesis submitted by D. F. Farkas in partial fulfillment of requirements for the degree of Master of Science in Food Technology at the Institute.

End *(Resume reading on page 54)*

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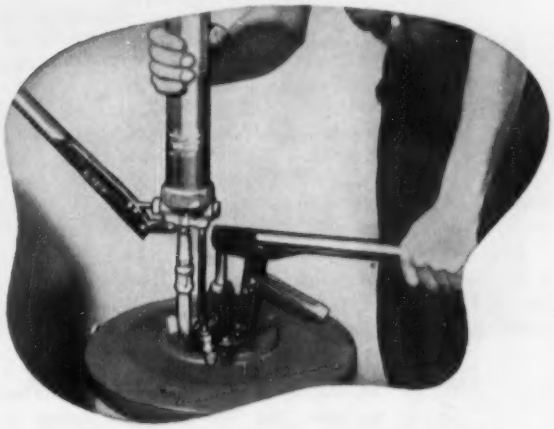

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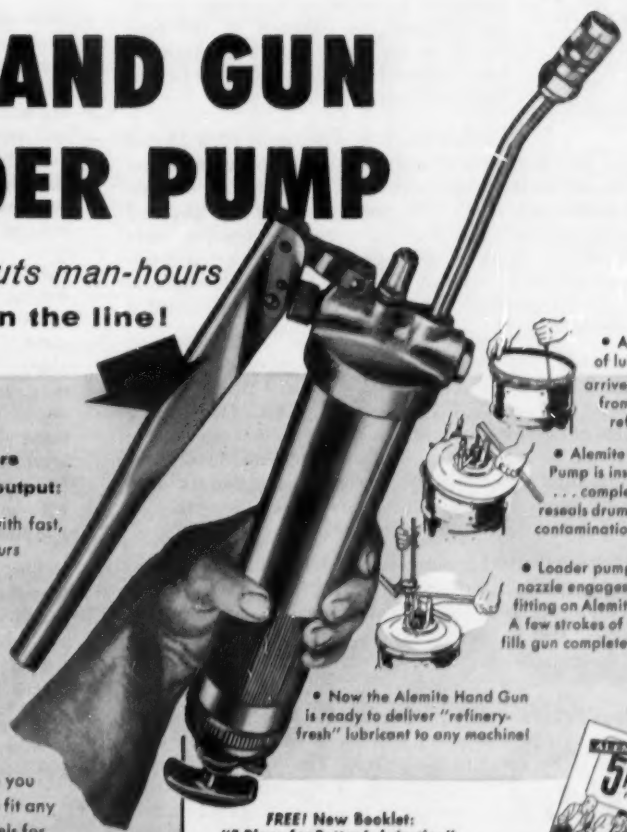

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INSIDE SCIENCE

The Vital Story of VITAMIN C

by Science Writer

What does vitamin C do for human beings?

Medical research shows that it is essential in maintaining healthy bony tissue and for the formation of collagen which is the main supportive protein of skin, tendon, bone, cartilage and connective tissue. It is needed for vascular function and tissue respiration and in promoting the healing of wounds. In lactating women it has great importance in providing the infant with a sufficient amount of ascorbic acid to prevent scurvy, a disease to which very young babies are susceptible.

Much evidence is available in medical reports to show that a lack of this vital nutritive element can result in impaired health. And in those cases of frank scurvy which still occur, ascorbic acid is the specific medication.

History. The history of vitamin C is fascinating. Scurvy, known for centuries, was once the most prevalent disease in Europe. It afflicted the Crusaders, decimated the crews of voyagers and armies, and plagued the colonists of the New World. In the 18th Century the antiscorbutic value of fresh vegetables and citrus fruits was recognized.

Isolation. It was not until 1918-25 that almost pure ascorbic acid was concentrated from the lemon by Zilva and its important properties and molecular composition established. In 1927 he concluded that this so-called "reducing factor" and the antiscorbutic principle were closely related. In 1928, Szent-Györgyi, who started investigations in 1921, isolated a strong reducing compound from adrenal glands, oranges, and cabbage and termed it "hexuronic acid."

Chemistry. The "reducing factor," "hexuronic acid," and vitamin C were all identified as the same in 1932 by various groups of workers. This was one year after C. G. King, by methods of organic chemistry and experimental physiology, established the chemical identification of vitamin C, thus fulfilling Budd's prediction of 90 years earlier that the antiscorbutic property of certain foods would ultimately be discovered to be a definite substance.

Synthesis. In 1933 Reichstein and his colleagues in Switzerland successfully synthesized ascorbic acid. Almost simultaneously in England Haworth and associates accomplished the same. The Reichstein synthesis formed the basis for large scale commercial production by the world-famous firm of Hoffmann-La Roche.

Production. Following these discoveries came the establishment of manufacturing operations so that today daily production by the tons is the rule. The figures are really staggering. The amount produced weekly in the U. S. A. averages over 15 tons, equivalent to that contained in over 200 million oranges. It is remarkable that ascorbic acid can be produced synthetically and sold for only about $16. per kilogram. One kilo is sufficient to supply 92 people for one year with the minimum daily requirements set by the U. S. Food and Drug Administration.

Vitamin C made by the Roche process is identical chemically and in biological activity with Nature's own product. Because vitamins can be manufactured at a much lower cost than if they were extracted from natural sources they are widely used in dietary supplements and pharmaceuticals. In fact, "New and Non-official Remedies," a publication of the American Medical Association for use by physicians states: "All pure ascorbic acid used in pharmaceutical products is prepared synthetically."

Ascorbic acid is present in many foods. Nature supplies some with lavish amounts and stints on others. In fact, wide variations* have been found in the vitamin C content in varieties of the same fruit.

Deficiencies. Many surveys have shown widespread vitamin C deficiencies in the population. Physicians may call these subclinical, but they are deficiencies nevertheless.

Because of these situations—natural variation and widespread deficiencies—diet experts believe that it is desirable and in the public interest to standardize the vitamin C content of processed fruit and vegetable juices by the addition of enough pure crystalline ascorbic acid to make them consistently dependable sources of this necessary food element. Some of these juices are: tomato, grape, orange, grapefruit, pineapple and apple.

Requirements. The U. S. Food & Drug Administration has set 30 milligrams as the adult minimum daily requirement of ascorbic acid. This daily intake is just about sufficient to prevent recognizable signs of vitamin C deficiencies although a subclinical or an unrecognized deficiency may exist. In view of this, the National Research Council has established 75 milligrams as the recommended daily male adult allowance and 70 mg. daily for female adults, which levels are supported by many controlled nutrition studies. However, the N. R. C. recommends 90 mg. daily for boys between 13 and 15, 100 mg. daily for boys between 16 and 20, and 150 mg. daily for lactating women.

This article is published in the interests of pharmaceutical manufacturers and food processors who make their good products better with essential, health-giving vitamin C. Reprints are freely available. Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West; Montreal, Quebec.

*The table shows minimum and maximum levels of ascorbic acid in commercially canned juices. All figures are in milligrams per 100 grams of juice. Data from U. S. Department of Agriculture.

	Min.	*Max.*
Apple juice	0.2	3.6
Grape juice	0.0	4.7
Grapefruit juice	10.0	49.0
Orange juice	9.7	70.0
Pineapple juice	5.4	18.0
Tomato Juice	2.5	32.0

ADVANCES IN TECHNOLOGY

Freezing Pimientos

A recently patented process for dehydrofreezing pimientos and peppers is said to avoid loss of juice and impairment of color.

Peppers are steam- or flame-peeled, then washed and broken up in an ice breaker. Stems and placenta are removed manually, seeds in a rotary reel. Meats are diced then centrifuged or pressed to separate the juice which is vacuum concentrated to approximately 50 Brix.

Meats are dehydrated to about ¼ original volume, then sprayed with the concentrated juice, packed in cartons and frozen.—U. S. Patent 2,723,-199, Nov. 8, 1955.

Apple and Grape Powders

Extensive storage tests have demonstrated that powdered apple and grape juice products may be stored without deterioration for at least one year at 73 F. and for six months at 100 F. when packed in 4-oz. cans with a desiccant.

Powders were prepared from blended concentrates of 75-80 deg. Brix, dried in a vacuum shelf dryer, and ground to 10-mesh size. Each can contained 95g. of powder and an envelope of tough paper containing 9g. of pelleted calcium oxide as a desiccant.

Moisture content for storage at 73 F. may be as high as 2.9% for apple and 2.5% for grape. For storage at 100 F. without caking, moisture content should be 2.0% or less for apple and 1.7% or less for grape. Storage stability was unaffected by packing in air, nitrogen, or under vacuum. The reconstituted juices were of good color and flavor.—*Food Technology*, 506-09, Oct. 1955.

Puff-Dried Lemonade

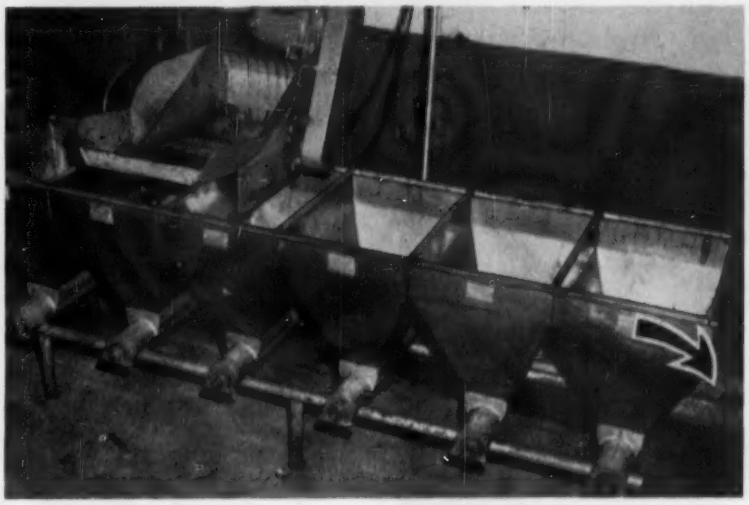
Unlike most powdered lemon mixes which contain corn syrup, citric acid, dextrose, and artificial color in addition to sucrose, lemon juice and lemon oil, a new powder has been developed that contains only the components of fresh lemonade.

Product is instantly soluble in cold water, and tastes and looks like lemonade prepared from freshly extracted juice. The similarity is enhanced when lemon juice containing broken juice sacs is used.

Stability tests now under way show that the powder undergoes no discernible changes in color or flavor after three months' storage at 70 F.

As a result of exploratory experiments, dryer feed was standardized at 65.7 deg. Brix and consisted of 59% sucrose, 8.3% lemon juice concentrate, 28.1% lemon juice, and 4.6% added water. Viscosity at 68 F. was 150 centipoises.

Experimentally the feed was poured onto stainless steel trays at the rate of ½-lb./sq. ft., and evaporated in a vacuum shelf dryer. During drying the concentrate puffs and expands from a film depth of ⅛ to 1½ in. Product is then cooled in the dryer before the vacuum is broken. The puff-dried lemonade is screened to 6-mesh size and packaged together with cold-pressed lemon oil locked in a solid carrier, and a dessicant. The container is then evacuated and sealed.—*Food Technology*, 503-05, Oct. 1955.



Continuous Vegetable Meter-Mixer Speeds Blending of Frozen Products

A volumetric feeding and mixing machine that is especially applicable to preparation of such products as frozen carrots and peas, or mixed vegetables from bulk-frozen vegetables is the subject of a recently patented invention.

The unit (photo above) comprises six hoppers with adjustable metering and feeding means in their bottoms, a breaker mounted on rollers that enables it to be moved the length of the unit, and a mixing screw conveyor.

In a typical installation, bulk frozen vegetables such as peas and lima beans are dumped from multi-wall bags into the desired hoppers. Diced carrots that tend to freeze together are passed through the breaker to separate the individual pieces, and drop into another hopper. Worms in hopper bottoms then meter the various vegetables into the screw conveyor (arrow) which mixes them as it moves them to packaging machine.

Worms in bottoms of hoppers are operated by a series of chains (not visible), all driven by one motor. Worm speeds can be changed (to change volume of feed) by use of different sized sprockets on their axles. —U. S. Patent 2,719,030, Sept. 27, 1955.

Dehydrocanning of Foods Offers Many Advantages

A process comprising partially dehydrating a solid, perishable foodstuff of relatively high moisture content, then canning and heat-sterilizing is the subject of a recent patent.

Products are first subjected to the preparation steps of washing, peeling, trimming, removal of cores or seeds,

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and cutting into pieces suitable for placing in cans. Then they are blanched or sulfited, followed by dehydrating to a moisture content of 35 to 70%.

Forced-air dehydrators of the tunnel, tray, continuous belt, or rotary kiln type employing air at 140-225 F. are recommended.

Partially dehydrated product is then sterilized by contact with live steam, and packed in suitable containers which are sealed under vacuum. Filled containers are heated with steam or boiling water for 10 min., then cooled with water and stacked to enable air drying.—U. S. Patent 2,718,470, Sept. 20, 1955.

Sorbic Acid Controls Rot-Producing Fungi

Growth of fungi that produce rot in strawberries and tomatoes can be effectively inhibited by sorbic acid.

Two organisms known to cause rot in these fruits were selected and exposed to the fungistatic agent in a liquid glucose peptone medium. Concentrations of sorbic ranged from 0.01 to 0.10%, and pH of the medium was adjusted to 3.0, 5.0, and 7.0. After inoculation, observations of growth were made at the end of 7 and 14 days.

A strawberry puree at pH 3.3 and 4.0 was inoculated with molds isolated from strawberry fruits and treated with varying percentages of sorbic acid. Observations of growth were made at the end of 7 and 14 days. A similar test was made with tomato juice.

In the first two experiments some strains of *Pencillium*, *Alternaria*, and *Aspergillus* showed slight growth at a pH of 4.0 in 0.050% sorbic acid. In the tomato juice, all fungi except one strain of *Aspergillus* were inhibited at a pH of 4.4 by 0.050% sorbic acid. When 0.075% sorbic was added to the various media no growth occurred. The more important fungi causing rot in strawberry and in tomato fruits were inhibited by 0.025% sorbic acid. —*Food Technology*, 486-88, Oct. 1955.

Thermodynamic Properties Effect Freezing Rates

In the quick-freezing of fish or other foods, the time-temperature curve, measured at the thermodynamic center of the freezing block has a typical form.

Following a uniform drop as the block enters the zone of freezing temperatures, a nearly flat "plateau" oc-

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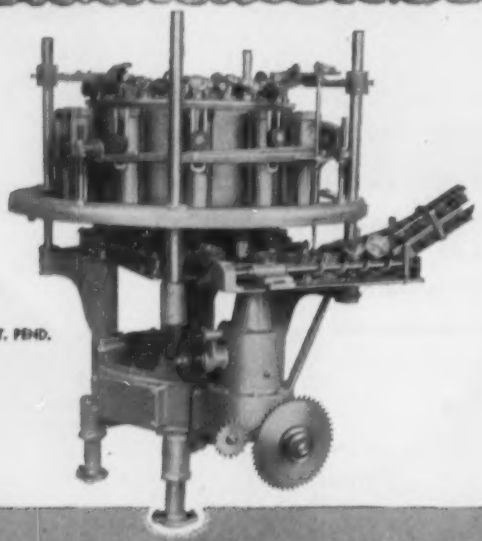

PAT. PEND.

LIBRASCOPE FILLERS

FEATURE HIGH OUTPUT . . .
LOW MAINTENANCE COSTS

PISTON-TYPE *(shown at left: a 12-station model set up to handle dog food)* —Exhibited for the first time at the show will be a 25-station production model set up for baby food at speeds up to 800 containers per minute. Unit features exclusive new Librascope self-cleaning action that prevents build-up of product on valve guides and ports — eliminates frequent cleaning operations. Plunger-type valve design maintains positive closure against leakage, assures correct filling level, and provides longer valve life. All product contacts are 316 stainless steel or non-copper alloy for the utmost in surgical cleanliness. Manufactured by Librascope, Inc. Exclusive distributor: W. F. & John Barnes Company.

GRAVITY-TYPE — A Librascope 12-station production model for handling 46-ounce cans will also be exhibited.

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NEW HEAT EXCHANGER

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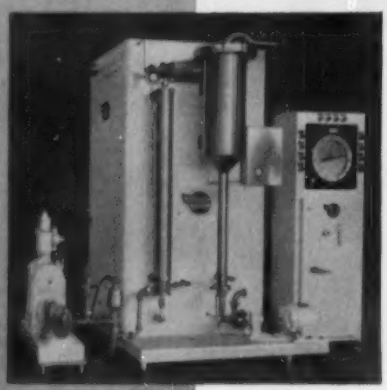

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FOOD & CONTAINER SECTION

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curs corresponding to release of latent heat as water in the food changes to ice. When the food is completely frozen its temperature drops very rapidly as it approaches that of the freezing medium.

The "thermal arrest time," that required for the center of the block to pass from 32 to 23 F. is significantly affected by initial temperature of the food. Thus, haddock fillets 15 in. long and 6 in. wide, frozen in a −15 F. air blast with a velocity of 31 ft./sec. had an "arrest time" of 65 min. when initial temperature of fish was 36 F. With an initial temperature of 56 F., this time was reduced to 53 min.

This paradoxical effect of a shorter arrest time with a higher initial temperature casts considerable doubt on the validity of previous studies of food freezing, since the initial temperatures have rarely been indicated. No simple explanation has been found, but it seems to be related to the rate of heat abstraction from the center of the freezing block, and this is greater for an initially warmer block.—*Journal of the Science of Food & Agriculture*, 621-33, 1955.

Fluorescence Microscopy For Fat in Milk

For microscopic examination of milk or milk powder, fat globules can be rendered fluorescent and visible by addition of so-called fluorochomes.

Method is analogous to the ordinary biological staining process. In the latter, fat globules may be stained with indophenol and the specimen examined in transmitted light. In the fluorochroming procedure the fat globules are made fluorescent by the addition of a suitable dye, and the specimen examined in the fluorescence microscope. Among dyes suitable for the purpose, phosphine in 0.1% aqueous solution has given the best results.

Equipment comprises a research type microscope and a high-pressure mercury vapor lamp, the light from which passes through a condenser, water cell, and deep blue filter which transmits the violet rays. Specimen is illuminated in the usual way with a 3-lens condenser of numerical aperture 1.40, the iris diaphragm being left wide open. A yellow filter, complementary to the blue lamp filter, is inserted in the eyepiece.

Image is bright and distinct due to pronounced contrasts, vivid colors, and dark background. Light intensity, however, is very low, requiring long exposure for photomicrographic work.

Whole milk, cream, skim milk, buttermilk, sweetened and unsweetened

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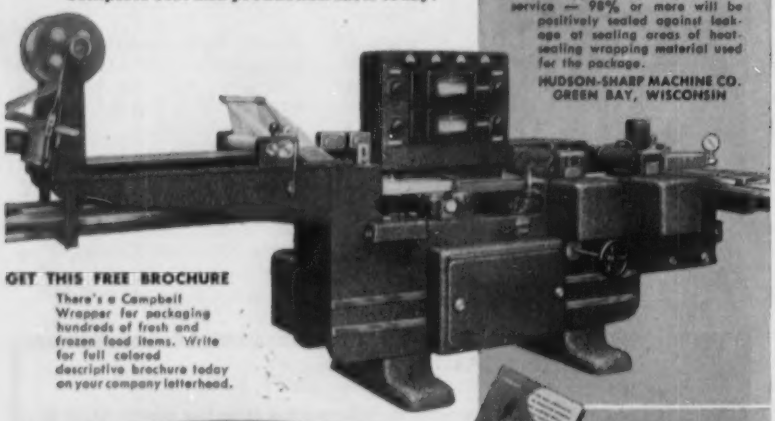

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condensed milk, milk powder, and powdered ice cream mix are amenable to fluorescence microscopy. Fat globules as small as 0.3μ are easily seen and measured.

In order to make the fat particles in milk powder more easily discernible, two fluorochromes in glycerole are used—phosphine for fat and basic fuchsine for proteinaceous matter. Droplets of the two solutions are mixed on a slide. Powder is admixed and covered lightly with a glass. This procedure gives a sharp differentiation between the two components.—*Journal of Dairy Research*, 205-210, May, 1955.

No-Hold Pasteurization Of Ice Cream Mix

Temperatures of 187.2 and 194 F., respectively, without holding, cause bacterial destruction in ice cream mixes equivalent to 155 and 160 F. for 30 min.

These are findings resulting from tests conducted with *Micrococcus* sp. MS 102. Mixes containing 12% fat and 38-40% total solids were preheated to 120-130 F., inoculated and agitated 10 min. to insure dispersion. They were pasteurized at temperatures from 180-200 F. by passing through a Roswell heater.

Minimum holding time was found to be 0.8 sec. And use of a 3-sec. holding tube permitted observations at 3.8 sec. Results showed that 187.2 F. for 0.8 sec. or 181.3 for 3.8 sec. give destruction equivalent to 155 F. for 30 min. And that 194 F. for 0.8 sec. or 187 for 3.8 sec. was equal to 160 F. for 30 min. Latter temperatures and times were also equivalent to 175 F. for 25 sec.—*Journal of Dairy Science*, 959-68, Sept. 1955.

Shelf Life of Sour Cream Upped by New Process

An improved method for manufacturing a sour cream-like product that will have a shelf-life substantially greater than commercial sour cream and which is more economical to make and merchandise is the object of a recent invention.

In its manufacture, a "cream" containing 7-12% fat and 2.6-2.9% protein is pasteurized, homogenized and cooled to 70 F. A lactic starter is added and the mixture allowed to ripen until acidity of the whey is 0.7-0.9%. It is then heated to 165 F. for 15 min. to break the whey, centrifuged to separate whey from curd.

A part of the whey is added back to the curd to give a fat content of

S/K apades in industry

THE CASE OF THE PUNGENT POTS AND THE PROCESS MAN WITH A PLAN

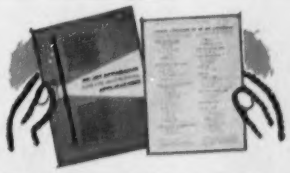
"Gadzooks!" cried Pete the Process Engineer, as he clamped a clothespin on his nose. "I dever sbelled anythig as obdoxious as doze *rendering* keddles."

The kettles kept right on fuming—and so did the employees who had to endure the odor.

"Do somethig," gasped the Plant Manager. "Those nauseatig fubes and odors are perbeating the whole fagtory. Peoble turn up their dozes at working here . . . "

Pete went into his office and held his head. A jet unit would alleviate odors and pacify his disgruntled boss. A jet unit, but what kind? And what about hoods, ductwork, recirculating system? A *jet* unit? Yes! No fan to corrode or wear out . . .

Pete wrote Schutte and Koerting for a copy of new Bulletin J-1 on "Jet Apparatus and Its Industrial Applications." That told him all he needed to know about the varieties, ranges and characteristics of Jet Apparatus.

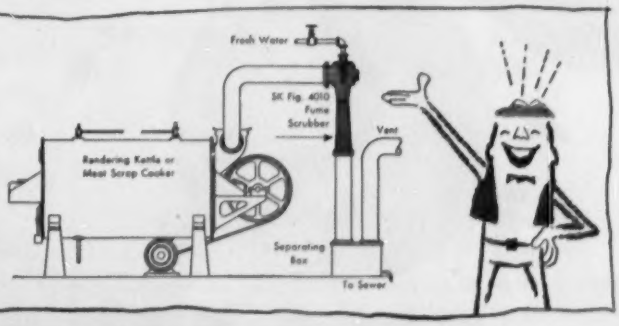


Bulletin J-1 pinpointed the data he needed. He located the desired function, the types of jets suitable for such a function, the type most suitable for his particular requirements.

Then he phoned for a specialist—his nearby SK Sales Engineer, who came a-running. And from him, Pete got a specific recommendation.

LICKED THE PROBLEM IN A JIFFY!

The SK Fig. 4010 Fume Scrubber now removes fumes from the fat melter and discharges clean air to atmosphere. The material being rendered contains a large percentage of moisture, therefore, a large percentage of the fumes is water which must be condensed. The Fume Scrubber has been operating successfully for some time.



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A for apple is the beginning of most primers. And apple is the first choice in flavor with most Americans, who enjoy an alphabet of apple dishes. To the distinguished family of Firmenich flavors, now enhancing many food products, is added that of Apple, captured by patient research and recreated by chemical skill. It is another Firmenich achievement, already welcomed by manufacturers who have added this popular flavor to their line of products; by others to improve those already established. Highly concentrated, stable, of the utmost fidelity and purity, Imitation Apple by Firmenich is offered with pride for your profitable use. Samples and technical data on request.

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18% in the mixture. Then it is heated to 145 F. to pasteurize, homogenized at a high pressure, filled hot, and stored under refrigeration.

To minimize exudation of whey, a suitable stabilizer may be added to the cream prior to homogenization. Suggested are vegetable gums and Irish moss extract.

When kept under refrigeration the new product is said to have a shelf life of 20 days without deterioration. —U. S. Patent 2,719,793, October 4, 1955.

Low-Temperature Spreads From Vegetable Oils

Products having the essential physical and nutritional properties of butter or margarine, and spreadability over a wide range of temperatures are the subjects of a recently patented invention.

Basic composition of the spread is 80-90% vegetable oil, 10-20% mono- or di-glycerides of fat acids that normally occur in the particular oil, or mixtures of the glycerides, and 0.5-2.0% polyalkylene glycol esters of fat oils.

In their preparation, the glycerides are dissolved in the vegetable oil at relatively high temperatures. Then the esters are added followed by rapid chilling to induce formation of large numbers of crystals that are extremely small.

Spreads may contain added fruits, nuts, flavors, coloring materials, and vitamins. They may be molded in any desired cake or print form and will retain this form over a wide range of temperatures. When mildly worked, as when spread on bread, their stiffness diminishes and they become readily spreadable, even at 0 F.—U. S. Patent 2,718,468, September 20, 1955.

Proper Freezing Procedures Keep Bread Fresh

For best results in preserving freshness, bread should be (1) Frozen as soon as possible after baking; (2) frozen and defrosted as rapidly as possible, and (3) stored at 0 F. or below.

Care should also be taken to store it separate from other strongly flavored or odorous materials.

These are the principal conclusions reached in a series of experiments in which both physical tests and organoleptic judgments were used to evaluate the variations in freezing procedures.

The taste panel was quite sensitive

CUT COOLING TIME

RAISE PROCESS QUALITY

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C. H. WHEELER VACUUM REFRIGERATION

Employing the principle of flash evaporation, here's what C. H. Wheeler Steam Jet Vacuum Refrigeration will give you in food processing:

Low initial cost of equipment in standard assemblies consisting of steam jet ejectors, boosters, barometric or surface condensers and water pumps • Low installation cost • Low cost operation using plant steam at pressures down to 2 psi • Savings in space in plant, on roof or outdoors • Savings on maintenance, because there are no moving parts in a steam jet vacuum system except the chilled water pump • Uniform production capacity, because there is no wear or scale formation • Easy operation with either manual or automatic instrument control • Overload capacity without damage • Economical operation at part load • Maximum safety, no noxious gases, no pressure or explosion hazard • No noise or vibration • Cooling to any temperature above 35° F.

TYPICAL ADVANTAGES OF C. H. WHEELER STEAM JET VACUUM REFRIGERATION IN SPECIFIC APPLICATIONS:

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Savings on packaging, shipping and labor.

MEATS

Faster cooling penetrates centers, raises quality, reduces spoilage.

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Recycling conserves water for various plant cooling requirements.

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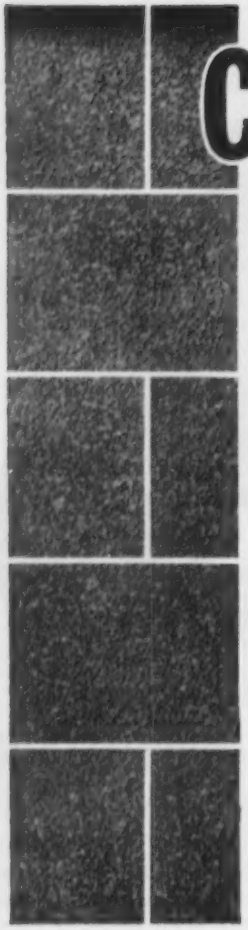

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FOR LOW TEMPERATURE INSULATION

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- Corkboard is fire retardant; insect, vermin resistant.
- Corkboard is structurally strong, yet flexible—saves space.
- Corkboard is light in weight; installs easily, works like lumber. Bonds tightly with cement, paint, hot or cold asphalt.

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Your nearby United Cork Companies branch office provides a *complete* corkboard service . . . *from product to final installation* . . . to meet your individual needs. Trained engineers are available for consultation . . . or will design every detail of your job. If you desire, our skilled work crews, supervised by the same engineers, will erect your installation. Our patented BB (block-baked) Corkboard is specially prepared for low temperature work. It's *all* cork without added fillers or binders. The straight-edge slabs of corkboard fit accurately, can be bonded to most common structural materials with low cost, readily available bonding materials.

For close to half a century, United Cork Companies' products and services have been geared to the needs of refrigeration engineers and plant operators. This experience assures the satisfactory performance of *your* BB Corkboard installation . . . today and for years to come.

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to a relatively small difference in age of bread at time of freezing. Both physical and organoleptic tests demonstrated the greater influence of rate of freezing compared with rate of defrosting on quality of bread up to 48 hr. after defrosting.

Zero F. or below was required to prevent a significant increase in firmness during storage for more than one week. Ten deg. F. was permissible for only a few days. On the basis of flavor alone, no distinction could be made between bread stored four weeks at 10 F., at 0 F., and day-old unfrozen bread. Crumb firmness was substantially increased by re-freezing, the increase diminishing each time the process was repeated.—*Food Technology*, 495-99, Oct. 1955.

Preventing Infestation

Grain bags impregnated with DDT or lindane prevent insect attacks on the grain stored in them. But insects present in the grain at the time of storage are not killed by treatment of the bags.

Injection of insecticides directly into the bags proved effective, however, for methyl bromide, ethylene dichloride-carbon tetrachloride (EDCT), acrylonitrile, carbon tetrachloride, and ethylene dibromide were introduced by means of a glass syringe. Ethylene dibromide, (10 ml./200-lb. bag), completely controlled insects, whether the bags were stored vertically or horizontally, and whether the injections were made at one or two places. Bags stored in stacks could be freed of insects by use of 7½ ml.

Control was complete in both plain and lindane-impregnated bags (35 mg. lindane/sq. ft), but a count of dead insects indicated that some were able to escape from plain bags before the fumigant reached them, and were then able to spread the infestation elsewhere. Tests showed absorption of 12-31 ppm. ethylene dibromide, well below the limit of 50 ppm. usually permitted for methyl bromide. —*Journal of the Science of Food & Agriculture*, 637-40, 1955.

Fork Truck Attachment Eases Plate Handling

A freight car running board lifting and handling devise for use with a fork lift truck having both laterally and vertically movable arms is the object of a recent patent.

Mechanism comprises a pair of telescoping tubular members with a slotted hanger on each that receives on arm of the fork truck and is supported by it. Free ends of the tubular members are formed into inwardly

turned hooks that provide inclined surfaces for engagement with under side of the running board. Ends of above mentioned hangers extend beyond sides of the tubular members to form flat surfaces which prevent running board from tilting as it is lifted by the grab hooks.

In operation, fork truck arms are moved outward laterally until hooks clear ends of plate, then brought back until hooks are under plate. Arms are then lifted and truck moved to desired location where process is reversed to set plate in position.— U. S. Patent 2,719,643, Oct. 4, 1955.

Ice Cream Dispenser

A mechanism for dispensing ice cream in precise quantities directly from conventional round containers is the subject of a recent invention.

The mechanism comprises a support that fits the top of an ice cream cabinet and holds a supply of product, a scoop journaled to turn in the support, a flexible diaphragm in the scoop, means to turn the scoop and expel ice cream from it. Also included is means for forcing ice cream from the original container into the above mentioned support.

Devise is said to fit in existing ice cream cabinets with little alteration. —U. S. Patent 2,719,494, Oct. 4, 1955.

Aeration Rate of Liquids Influenced by Agitation

Oxygen absorption is necessary for purification of polluted water of streams, in bio-oxidation of wastes in disposal plants, and in certain types of fermentation industries.

Basic phenomenon is the transfer of oxygen across an air-water interface and, in natural bodies of water, this depends largely on the degree of agitation, particularly of the water's surface.

Laboratory studies on tanks in which water was agitated by stirring while air was blown across its surfaces, showed a relatively slow increase in aeration rate until the surface was visibly disturbed. When either stable or choppy waves were generated, the aeration rate increased linearly with wave height and frequency.

Temperature rise increases aeration rate almost linearly, the coefficient being 2.37% of the 20 C. rate per deg. Oil films had little effect until their thickness exceeded 10^{-4} cm. Presence of surface-active agents in the water reduced the aeration rate 24-43%, depending on water supply and degree of surface agitation.—*Journal of Applied Chemistry*, 570-81, 1955.

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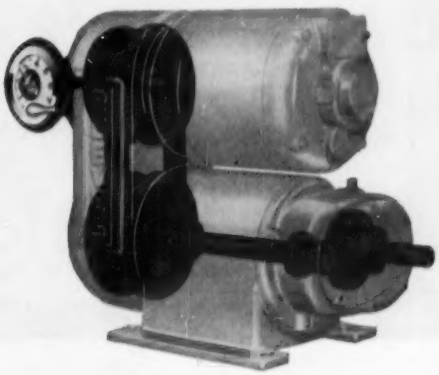

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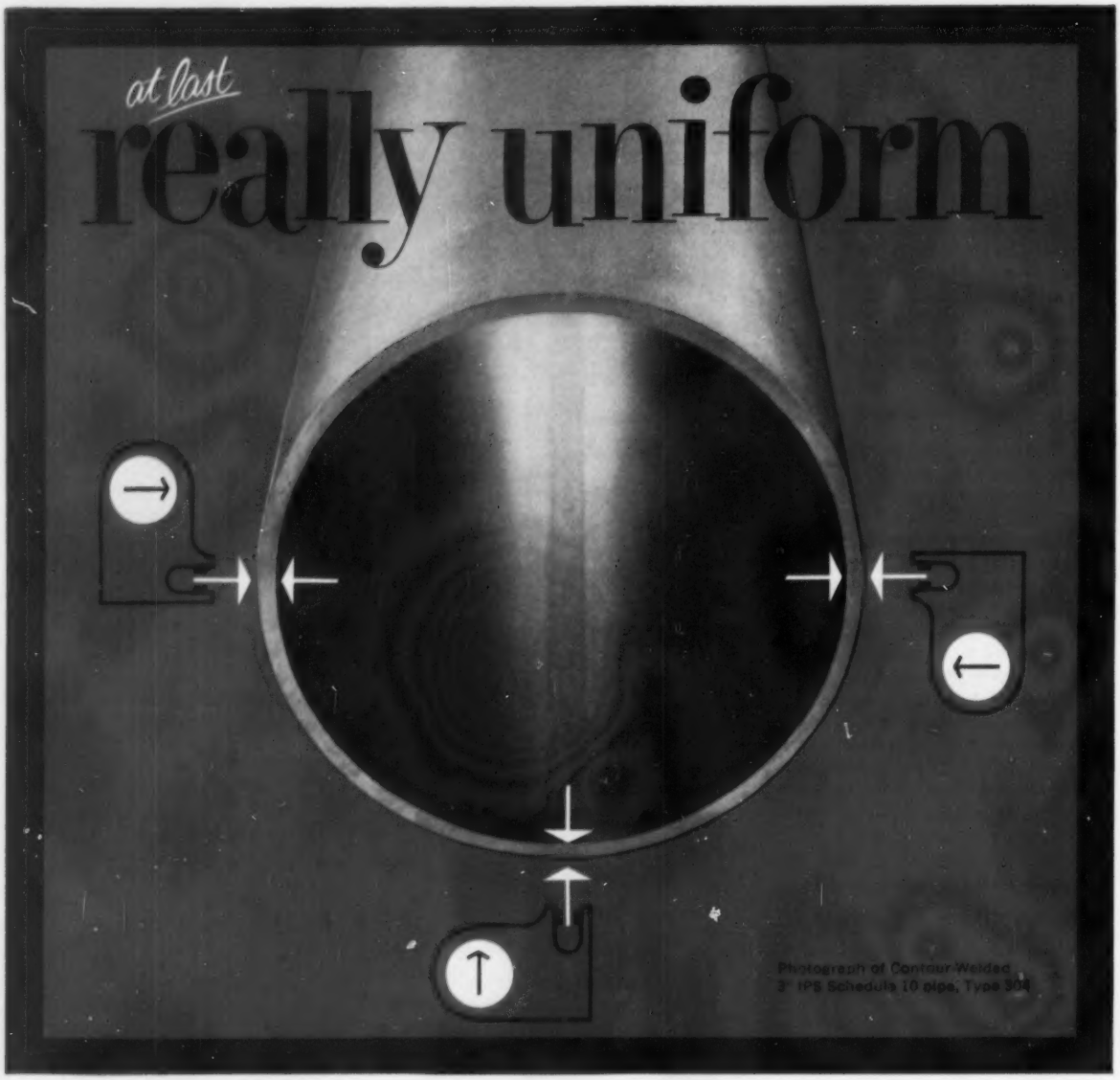
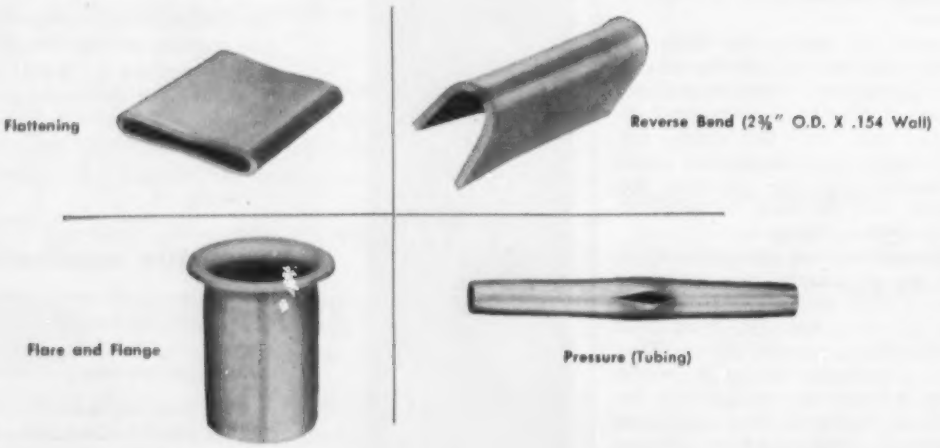


Photograph of Contour-Welded 3" IPS Schedule 10 pipe, Type 304

CONTOUR-WELD PIPE...BEST BY ANY TEST YOU CAN NAME



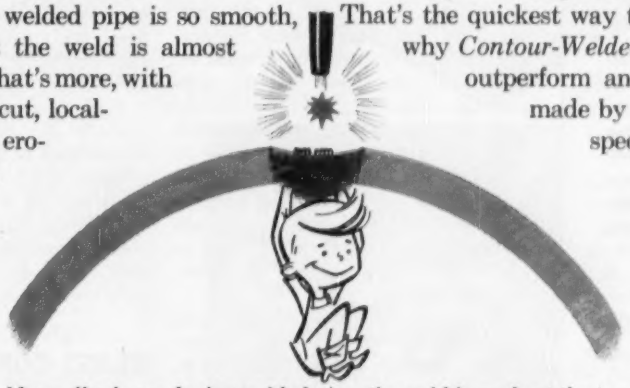
stainless pipe

...by Trent's new Contour-Weld process

Trent's new, patented *Contour-Welded*® stainless pipe and tubing gives you all the uniformity of wall thickness you'd expect in welded pipe and tubing – plus equal uniformity in the weld zone itself.

This new-type welded pipe is so smooth, so uniform, that the weld is almost imperceptible. What's more, with no bead or undercut, localized corrosion or erosion is eliminated . . . physical properties are better than those of any other pipe, welded or not.

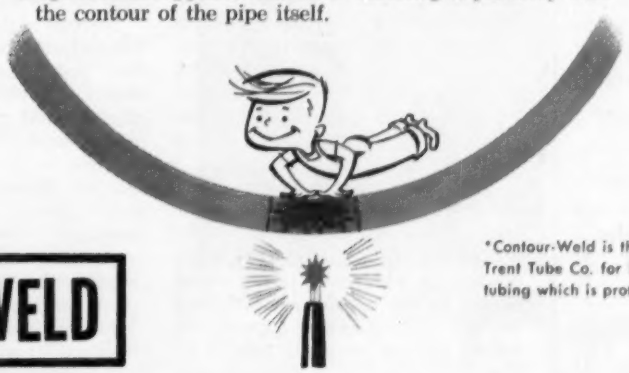
But try Trent's new *Contour-Welded* pipe or tubing yourself. As a matter of fact, ask for a sample – and give it any test you like. That's the quickest way to see for yourself why *Contour-Welded* pipe and tubing outperform any other. And it's made by Trent – tube mill specialists.



Normally, in producing welded pipe, the weld is made at the top. But gravity plays a nasty trick. It tugs at the fluid metal in the weld zone, pulling it down toward the middle of the pipe. The result, particularly in the heavier gages, is a perceptible bulge where it hurts the most—right on the I.D. surface. If you try to get rid of the bulge—at fair cost—the metal is undercut—and corrosion and erosion start there.

Why Trent's Exclusive *Contour-Weld* Process Means Smoother Welds . . .

But Trent put a stop to that—simply by going into partnership with gravity. With their exclusive *Contour-Welding* process, they weld at the bottom—and gravity works for them. For then, the bulge is in the opposite direction—blending in perfectly with the contour of the pipe itself.



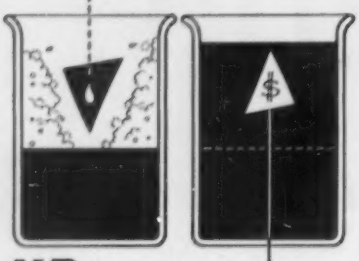
TRENTWELD

*Contour-Weld is the trade mark of the Trent Tube Co. for its process of welding pipe and tubing which is protected under U.S. Patent 2,716,692.

STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)

DOWN goes foam



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textile sizing

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2,075 lb
chocolate syrup

[1] Permissible in food processing at concentrations up to 10 ppm.
[2] Permissible in food processing at concentrations up to 32 ppm.

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* T M DOW CORNING

Auto-Milling of Flour

—*Continued from page 68*

siderable experience, nevertheless each flow should be analyzed to determine its own critical points.

Feedback or continuous weigh points for the break section are on the scalp or first tail of the first-, second-, and third-break sifter sections. For the fourth break, it is on the second tail of the fourth-break sifter section. Thus, we still have not only a check on grinding release, but also a constant watchdog on load going to the tail segment of the flowline. And the same reasoning holds for the fifth-break section.

It is important that visual inspection of certain stocks be maintained to insure a good cleanup. But they should still be checked by the man operating the mill's nerve center. Therefore, the control center must be located at a point such that the operator can obtain samples for visual inspection without leaving the control floor.

Samples must be taken either in the vertical lift or from the gravity down-spouting. There are certain points (marked on the flowsheet) at which visual feedbacks can be minimized.

There are two other points which are feedbacks for the break sections which, although not so critical, warrant consideration. These are the thrus of the flour cloths on second- and third-break sections, which are important in control of patent flours.

The reduction segment of the flowline is the heart of the process, since best-grade flours are made here. Feed to the sizings and first, second, and third midds requires surveillance, which serves not only as a check on purifier operation, but also gives a secondary check on break-system efficiency.

Thrus of the flour sections of their respective sifter sections should be used as feedback points for the same roll sections. Here again, measurement of grinding release can be properly policed. In addition, the second tail or cut of the sizing section should be monitored.

Overs of the flour cloth from duster and sixth-midds sections should be used to feed back information needed to control the tail segment of the flowline, in addition to points already offered in the fourth- and fifth-break sections. This gives very accurate control of feed to low-grade rolls of the flow.

Then to finish the job, we put a control on the clear flour and regulate the whole mill at this point. This is extremely important, because a control on clear flour initially indicates a warning to check all feedback data should trouble show up in the flow.

The foregoing are the elements of flour-mill instrumentation. Yes, and the tools are available—so let's use them.

The above feature is an abstract of a talk given by the author at the St. Louis meeting of the Assn. of Operative Millers.

End (*Resume reading on page 69*)

Bottlers Weigh Problems

—*Continued from page 71*

be moved from the opening in the tank head to the center, where it will be more effective. Opening has Lucite cover for greater visibility. Tank is also equipped with filtered-air vent and fan to prevent condensation.

A new type all-purpose closed tank, made in sizes from 750-5,000 gal., has reverse dish bottom, also an off-center agitator designed to produce maximum mixing without foaming.

Optional features for this unit include germicidal lamps, easily cleanable liquid level gage, and channel wall sections for heating or cooling.

GLASS CONTAINERS

Of the three enemies of glass bottles—impact, thermal shock, and hydrostatic pressure—impact is by far the worst, according to L. K. Pickering, Pepsi-Cola Co.

In an effort to reduce breakage from impact, plastic and silicone coatings were tried. The former did a satisfactory job of raising impact strength and resisting action of caustic solutions. But its coefficient of expansion was not the same as glass and, therefore, a durable coating was not obtained.

Silicone coated bottles resisted abrasion when subjected to the "joggle" test. But when put through the normal filling and washing procedures, they showed no advantage over non-treated ones. Apparently, the caustic solution in the washer removed the silicone. However, additional extended tests are planned with this type coating.

Another means of reducing impact breakage is use of full-depth, 6-bottle paper carriers. These cost $16-$20 per 1,000, but reduction in breakage with their use seems to justify the expense.

Additional recommendations for reducing bottle breakage were:

1. Use of automatic uncasing and casing machines.

2. Palletizing.
3. Maintaining production equipment so it will not punish bottles.
4. Teaching plant men and driver-salesmen the best ways to hand-load and unload a case.
5. Using proper case dividers and keeping them in repair.
6. Use of good quality crown pullers on vendors, coolers, and at special events.

LIQUID SUGARS

The enormous growth of carbonated beverage sales in the past 50 years was brought about principally by improvements in refined sugar products, in the opinion of D. V. Wadsworth, Refined Syrups & Sugars, Inc.

These improvements have been mainly in reduction of the turbidity caused by presence of natural non-sugar constituents.

In the case of liquid sugar produced by his company, most of these colloidal organic constituents were removed by an installation (in 1939) employing both bonechar and vegetable carbon. The bonechar has a marked affinity for irreversible colloidal matters, and the vegetable carbon has an affinity for reversible colloids released by the bonechar.

Following World War II, research was launched on use of ion exchange for further reduction of turbidity by removal of trace elements. It resulted in installation of such equipment in the late '40's.

Today, liquid sugar receives the triple treatment—bonechar, vegetable carbon, ion exchange—which makes it practically free from colloids.

METAL COATINGS

A 7-point program for evaluating metal containers for carbonated beverages was suggested by B. E. Byrd, Marlboro Beverage Co., San Francisco.

In his program, a test pack is made and checked for:

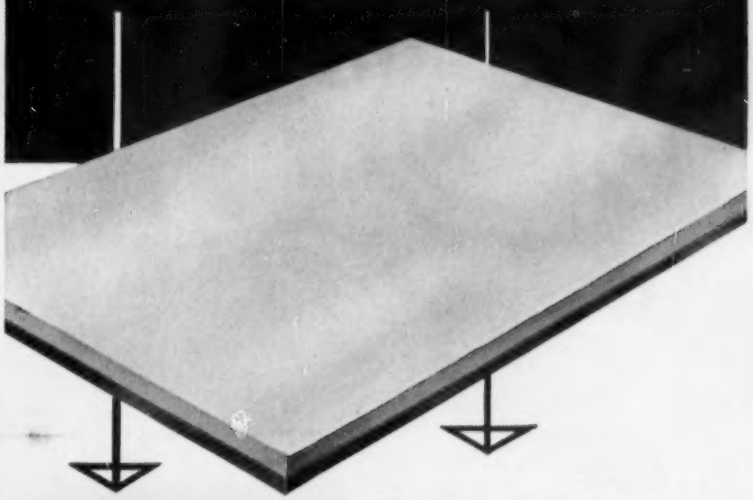
1. Taste and appearance. 2. Entrapped air. 3. Iron pickup. 4. Tin pickup. 5. Carbonation. 6. Bacteriological condition of container and product. 7. Lining failure and perforations.

Some test results indicate that shelf life of beverages may be extended by reducing air content to 2½ cc. or less, controlling azo dyes to 150 ppm. or less, and keeping copper content below 2 ppm.

Ingredients which seem to accelerate corrosion are SO_2, low methoxy pectin, and phosphoric acid in fruit drinks. The same acid in cola drinks does not seem to cause pinholing.

End (Resume reading on page 72)

TEFLON...
cleanest known material



cementable TEFLON...

on guide rails of conveyors and packaging machines

on work surfaces

lining machine hoppers...

write for bulletins GR-301 and MI-443

Cementable TEFLON is proving a boon to food manufacturers. It is a material so slippery on one side, nothing will adhere to it—not even the stickiest food product—and receptive on the other side to permanent cementing with commercial adhesives to any other material.

Cemented to steel guide rails of conveyors and packaging machines, food products are not damaged, packages are unmarred, no "jam-ups" occur in handling operations.

Cemented to table tops—clean up time is reduced to a minimum and sanitation is greatly improved because TEFLON sticks to nothing, is non-absorbent, tasteless, odorless, inert, non-contaminating, bacteria free.

Cemented to machine hoppers as a frictionless lining, dry powders and other materials flow freely—do not "bridge over". Vibrators are unnecessary.

Find out about this material that is serving food manufacturers better in so many ways. Ask your Industrial Distributor or write.

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Standardize on Taper-Lock. You save time and money and keep production rolling with these *interchangeable* bushings. See your Dodge Distributor, or write us for the full Taper-Lock story.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

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Standardize, economize with Taper-Lock, the bushing that is interchangeable in Dodge sheaves, sprockets, couplings and conveyor pulleys. *More than 2,000,000 in use!*

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of Mishawaka, Ind.

DODGE MANUFACTURING CORPORATION, 2800 UNION STREET, MISHAWAKA, INDIANA

Questions & Answers

THIS MONTH'S PROBLEM

Making Dehydrated Soups

Question—Our company plans to manufacture tomato bouillon and dehydrated soups such as pea, bean, vegetable, mushroom, onion, and chicken. Do you have formulas for these items?

NOVEMBER PROBLEM

Controlling Slurry Density

Question was—We'd like to work out a simple, foolproof system for controlling density of a starch slurry going into a continuous cooker. We want to feed a slurry of constant solids content to achieve uniform cooking. Have you or your readers suggestions?

Answer—It is relatively simple to maintain a constant flow of water, as well-known apparatus exists for this purpose. We suggest that a starch feeder be set up with a variable-speed drive, which would be actuated by a signal from a density controller to monitor slurry going to the cooker.

You might consider a new type of instrument that measures density of a slurry flowing through a pipe. Gamma rays from a radioactive source pass through the slurry and into a receiving cell on the opposite side of the pipe. (Ohmart Model PS Density Gauge, The Ohmart Corp., Cincinnati, O.)

Having no parts in the slurry stream, unit avoids difficulties arising from agglomeration of the starch particles, their abrasive effect, and necessity of keeping the device clean and sanitary. Also important is absence of moving parts, which simplifies maintenance.

Rugged and long-lived, this instrument is highly precise (depending upon pipe size and percentage of solids in slurry).

Naturally, the radioactive source is very carefully protected so that there is no radiation hazard to personnel. Heart of the device is the receiving cell which is hooked up to an indicator. But the minute current generated by the cell (magnitude depending upon slurry density) can be amplified and used to adjust the feed rate of the starch upward or downward as necessary. Final details are best worked out with the instrument manufacturer. Then, if a smoothly operating continuous cooking process replaces a cumbersome multiple-batch system, it should be worth the effort.

How Would You Do It?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise.) We pay space rates.

What is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

Making Mincemeat

Question—We'd like to add mincemeat to our line of bakery supplies. Can you furnish a formula and directions for making this product?

Answer—Grind and soak overnight: Raisins, 90 lb.; currants, 12¼ lb.; orange peel, 12 lb.; evaporated apples, 50 lb.; and citron peel, 5 lb.

To 18 gal. of water in a steam-jacketed kettle add: Sugar, 100 lb.; corn syrup, 50 lb.; molasses, 2 gal.; vinegar, 1 gal.; salt, 2¾ lb.; and sodium benzoate, 7 oz. Add ground fruit to kettle and bring to a boil.

Turn off steam and blend into batch: Cinnamon, 1¾ lb.; dry mustard, 9 oz.; allspice, 3½ oz.; nutmeg, 1¾ oz.; cloves, 1 oz.; and ginger, ¾ oz. While batch is cooling mix in 2 pt. of rum and 2 pt. of synthetic rum flavor.

For best flavor development, mincemeat is aged in wooden barrels.

Re October Maintenance Query

Anent the October problem, I'd suggest modernization economies with the plant purchasing one piece of equipment at a time.

Most companies that supply modern equipment will furnish an engineer or operator to help out with problems and fully demonstrate their machine. I think the only necessary factor is that the company hire personnel with basic training, theory and practical experience in the mechanical and electronic field. With all the text furnished on new equipment, I think a person with the above qualifications could do an exceptionally good job. It may, however, be necessary for the concern to send personnel to manufacturers who

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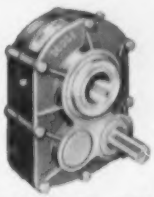

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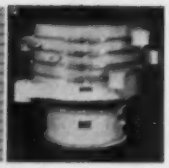
SCREENING NEWS

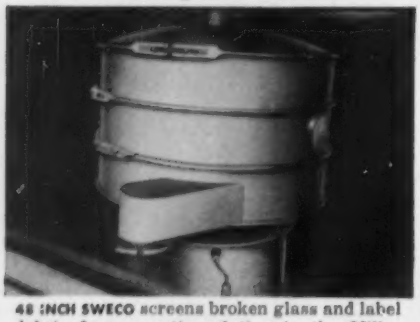


Miller Brewing Reclaims Bottle Washing Solution for Re-Use with 48 Inch SWECO

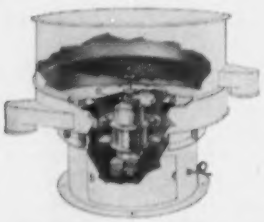
The Miller Brewing Company, Milwaukee, now saves thousands of gallons of caustic bottle washing solution by screen removal of broken glass and label debris. The screened solution is heated, then brought up to full strength and re-used. Previously, a large part of it went into the sewer carrying label pulp and other semi-solid waste matter. Miller's solution screening-regeneration cycle is continuous and is engineered to maintain an uninterrupted flow of caustic solution to bottle washing machines.

44% of the Largest U.S. Firms Use SWECO Separators

According to a recent customer survey, 55% of the nation's largest manufacturers use the products and/or engineering services of Southwestern Engineering Company. 44% are satisfied customers and users of SWECO Gyratory Screen Separators.



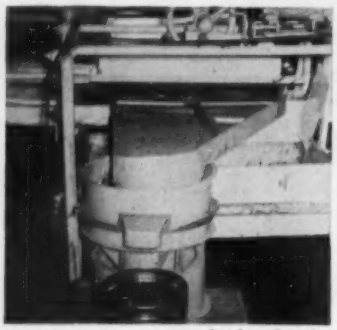
48 INCH SWECO screens broken glass and label debris from caustic solution in the Miller Brewing Co.'s bottle washing operations.



SWECO "3-D" SCREENING ACTION tumbles material in three directions at once... increases efficiency as much as 10 to 1.

Portable SWECO Turns Process Headache Into Profit for Oregon Fruit Products Co.

Oregon Fruit Products Company, Salem processors of premium fruits and berries, now use an 18-inch portable SWECO to screen broken berries from the circulating water system of the washer-grader line. Gyratory-vibratory action of the SWECO Separator screens and dewaters broken berries without further maceration; then feeds them into 30-pound tins for freezing and subsequent sale to jam and jelly processors. Company comment: "Well pleased with high utility, zero maintenance and successful conversion of production nuisance to a saleable by-product."



18 INCH SWECO recovers broken berries for freezing and profitable resale.

Now Available—SWECO's New "Process-Proved" Purchase Plan

Step 1. *Send for SWECO Engineering data files on screening operations similar to yours. (No cost or obligation.)*

Step 2. *Define your screening problem by forwarding SWECO Process Specification Sheet for SWECO Engineering analysis and recommendations. (No cost or obligation.)*

Step 3. *The SWECO resident engineer in your area will work out process and equipment details and refinements in your own plant with pilot model test runs. (No cost or obligation.)*

Result. *Installation planning and purchase are based upon in-plant process-proved performance data from Step 3.*

SEND FOR DATA FILE No. 61-33

SWECO

Southwestern Engineering Company
4800 Santa Fe Ave., Los Angeles 58, Calif. LOgan 8-6262

Engineers and Constructors... Manufacturers

supply such machines purchased, to further their knowledge.

The electronics field, you might say, is just opening up and it appears that every business who survives the next few years will have to keep up with modern trends.—*Carl Foster, Plant Sanitarian, John Morrell & Co., Ottumwa, Iowa.*

Still More

I would recommend that company's top management go to its nearest engineering college and select a graduate engineer who is interested in: (1) working with production equipment, (2) building mechanical gadgets, and (3) living in a small town, and (4) being offered a future with the company.

After securing a man with engineering training, support and encourage him. Make it possible for him to keep the equipment in top engineering shape. He should be encouraged to attend training schools, technical meetings, and seminars at company expense so he will be up to date and able to make valuable suggestions on new equipment and general plant operation.

In a few years, he may develop into an excellent plant manager. Cost of a person of this caliber may seem high, but the saving he can make for the company will be many times his cost.

A poor alternative would be to find an ambitious local boy, perhaps just out of high school, who has some mechanical inclination. Bring him into the plant, let him learn operations and then, when a piece of equipment is purchased, arrange with the factory to instruct this individual in correct maintenance and operation of the equipment.

In addition to this training on new equipment, send him to several 1- or 2-week training courses each year to give him general training on operation and maintenance of equipment. (A great many companies regularly hold training schools or seminars on the equipment they manufacture.)

In a few years, the company should develop a valuable mechanic.—*L. J. Pflug, Food Engineer, Michigan State University, East Lansing.*

Q.—Just for our information. Who originally put the hole in doughnuts?

A.—We'd never have known, but one of our editors passed through Camden, Me., where he spotted a monument to Henry Brewster. He invented the doughnut hole after hearing his mother remark that doughnut centers did not fully bake.

Settling an Argument

Question—Could you help settle a difference of opinion between our chief engineer and head electrician? Our engineer insists that the rate at which we recharge our lead-acid storage batteries for our lift trucks must be carefully controlled. However, our electrician says that it is only a matter of putting back into the batteries a certain number of ampere-hours, and that rate can't make any difference. Who is right? If it is our engineer, just what harm could improper charging rate do?

Answer—Judging from statements of battery makers, we would have to agree with your engineer in this case. What the electrician says sounds fundamentally right, but what he fails to consider is that if the charging rate is too high, not all of the electrical energy is usefully employed in charging the plates.

Thus, there is a waste of electricity, which a good engineer would never willingly tolerate. This waste goes in part to increase the temperature of the electrolyte, and partly to dissociate water into bubbles of hydrogen and oxygen. If the rate is high enough to cause violent gassing, it is possible to damage the plates and reduce the useful life of the battery.

What is a permissible charging rate? It will vary with many factors, chiefly the state of charge. (A fully-charged battery will gas at very low charging rates).

Two ways of controlling the rate to a safe level are: (1) To keep the temperature from exceeding 110 F., or (2) to maintain the initial charging amperes at no greater than the ampere-hours out of the battery (as determined by an ampere-hour meter on the vehicle).

More on Brined Wiener Cloud

Question—In the past August issue of Food Engineering (p. 170), you had a Question and Answer on brine becoming cloudy in glass-packed frankfurters. Cause, in this case, was traced to bacteria of Lactobacilli group thriving on sugar leeched out of the sausages. We've had a similar experience —formation of a cloudy brine. However, the cloudy brine was analyzed without evidence of bacteria of the Lactobacilli group. And we were advised that brine turbidity was attributed to protein leeching out of the sausage. Can you straighten us out?

Answer—Internal temperature of processed frankfurters reaches about 160 F.—a temperature sufficiently high to denature meat proteins and

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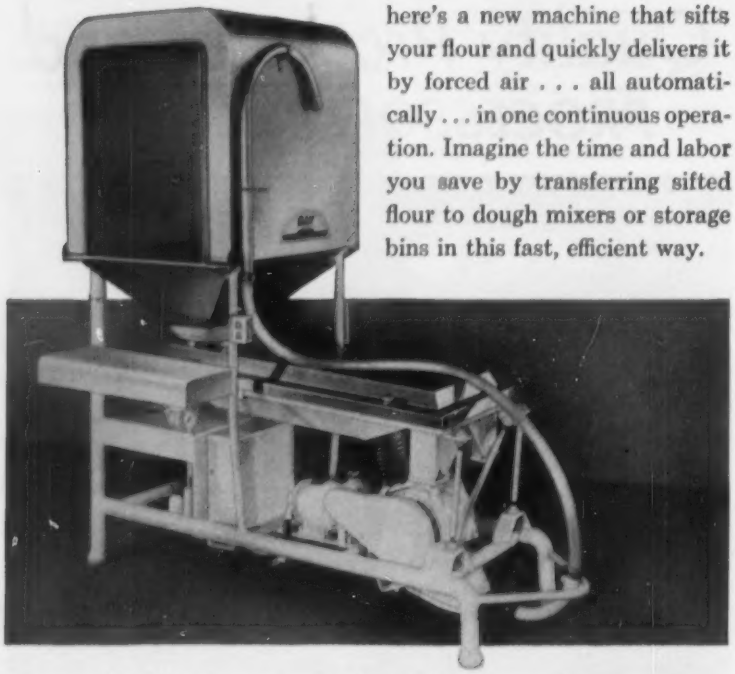

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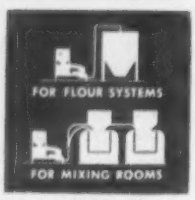
Flour is sifted in the popular Ro-Ball Sifter (one component of the Ro-Ball Airmatic) and is then blown to another point by a low-pressure air system, which requires only 4-12 psi and 10 cfm to convey 100 pounds of flour per minute. No objectionable dusting. Low air consumption permits use of your existing air lines. Sanitary construction throughout. For complete information write for Specification Sheet B-105RA.



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thus prevent them from leeching out of the brine-packed sausages.

While the cause may not (in your case) be pinpointed to bacteria of the Lactobacilli group, other microorganisms may be the culprit. Reason is that you are probably not using enough vinegar in the brine to effect the buffering action of meat proteins.

What happens then is this: Brine pH is raised to a point (an approximate guess—from 5.5 to 6.5) that permits growth of microorganisms.

Remember: It's the use of sufficient vinegar that checks bacterial growth.

Making Cheesecake

Question—We are in the frozen food business and would like to extend our line to include a frozen cheesecake packed in an aluminum foil pan. We have a good pastry formula, but we don't know how to make the cheese filling. Can you help us?

Answer—Mix in a large bowl: Cream cheese, 15 lb.; sugar, 4½ lb.; flour, 4½ oz.; vanilla extract, ⅞ oz.; grated lemon rind, 1⅛ oz.; and grated orange rind, 1⅛ oz.

After the batch is well blended, stir lightly with the addition of 3 lb. of eggs and 9 oz. of yolks. Then mix into batch 12 oz. of heavy cream.

Pour cheese filling over unbaked pastry in foil tray or pan, and bake 10 min. at 550 F. Then lower heat to 200 F., and bake 1 hr. Cool and then freeze.

Bulk Handling

Question—Lately, we have been reading with a great deal of interest about the huge installations being made for bulk receiving and handling of such materials as sugar and flour. It appears that large companies can afford the considerable capital investment required for conveyors, storage silos, push-button weighing, and the like, and that the resulting economies are worthwhile.

But we would like to know if a small concern can take advantage of the lower price of bulk materials without making such a big investment in handling equipment? Have you any suggestions?

Answer—One of the first points to determine is whether you can obtain bulk deliveries to your plant. This may require that your supplier equip himself with the apparatus necessary to load directly into a rail car of suitable construction, or a highway tank truck, and accurately weigh the shipment. The tendency today seems to be for suppliers to accommodate

customers who request bulk deliveries, as they, too, can profit by eliminating bagging and loading of bags.

Next, you will want to determine the best transportation method. This will depend upon whether you have a rail siding, distance from point of shipment, and supplier's policy with respect to furnishing the special cars or trucks. In some cases, the vehicles can be rented. In others, contract hauling can be arranged.

Assuming that you have worked out a method for getting the bulk material to your plant without a large tie-up of capital, the unloading and handling within the plant can often be handled efficiently and economically by using sanitary aluminum storage bins of a size suitable for handling with powered industrial trucks. A typical size bin will hold some 70 cu. ft., or close to two tons of a material like sugar. Yet, it can easily be moved by one man with a power truck.

Q.–Do blue-colored glass or plastic windows repel flying insects?

A.–On the contrary, insects are attracted by blue color.

You can arrange an unloading station in which a conveyor or blower is used to transfer from the incoming car or truck to these bins. Bins can then be stored wherever convenient, or taken to simple dumping stations to be emptied into hoppers feeding your processes. These stations can easily be equipped to dump controlled weights, if desired, for batching or inventory control purposes.

Big advantage of bulk handling in this manner is that the cost of bins, a truck to handle them, and a few dump stations is apt to be much lower than that of a large automatic system. This brings the economies of bulk handling within reach of smaller operators. Another point in its favor is its flexibility, permitting storage of various kinds of flour, for example, for a bakery.

A typical installation might cost about $3 per thousand pounds of sugar handled per year.

Dressing Difficulties

Question—We would appreciate information on a low-cost formula for non-separating French dressing, and procedure to homogenize. In addition, we would also like to prepare a dressing containing a high percentage of chili sauce with added pickle relish, and oil content of about 40%. Preferred is a stable emulsion with body somewhere between the easy-flowing French

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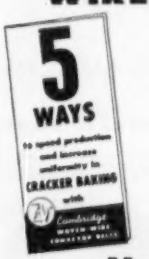

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Call in your Cambridge Field Engineer to discuss how you can cut food processing costs by continuous operation. You can rely on his advice. Write direct or look under "BELTING, Mechanical" in your classified telephone book.

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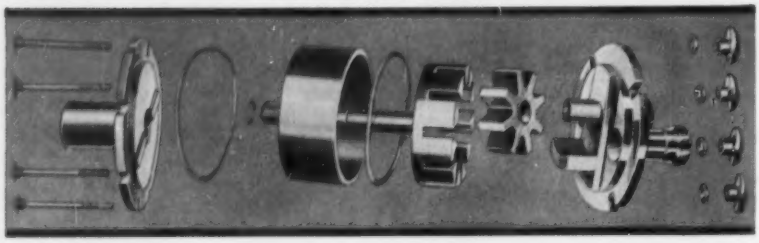

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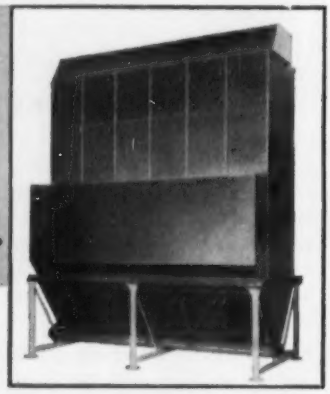

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dressing and thick sandwich spread.

In order to emulsify properly, we have found that the resultant body is heavier than desired. If we thin down with the addition of liquid, the emulsion breaks.

Employed is homogenizing equipment with a 400-rpm. pump, while homogenizing effect is obtained by flowing materials into a mixing tank and pumping them through a dispersing head with several plates (perforations graduated in each plate).

Answer—As a starting point, you might try this basic formula in which the "mixed dry flavoring materials" (see below) are stirred into the oil, remaining liquids are added, and the complete mix is agitated for 5 min. and homogenized.

Formula for mixed dry flavoring materials: Sugar, 230 lb.; salt, 80 lb.; paprika, 80 lb.; garlic salt, 3.0 lb.; onion salt, 3.0 lb.; and white pepper, 1.25 lb.

Formula for French dressing: Corn or cottonseed oil, 130.5 lb.; water, 54.25 lb.; cider vinegar (50 gr.), 23.0 lb.; tarragon vinegar, 23.0 lb.; lemon juice, 31.0 lb.; dark malt syrup, 4.5 lb.; mixed flavoring ingredients, 27.0 lb.; and citrus pectin, 4.5 lb.

It should be noted that this formula is offered prior to formulation of Federal Standards of Identity for French dressing and may, therefore, not be directly usable as it stands. We, therefore, recommend that you study these standards to determine what ingredients are permitted, and in what quantities (if limitations exist).

For example, oil content cannot be less than 35%. If you are seeking the lowest possible cost, it would appear necessary to work very close to this minimum oil content.

You did not mention what stabilizer you are using, for it will have a great deal to do with both stability and "body" of the finished product. In addition to pectin, mentioned above,

Q.—Do you have instructions on preparing and freezing fresh coconuts as well as formulas on sugar-ratio requirements?

A.—We know of no one freezing fresh coconuts. Some time ago, a large company ran into some difficulties shipping this product into this country. To freeze, you'd have to carry out the operation in a coconut-growing country. Coconuts should be shredded immediately after they are shelled, sugared with at least 32% sucrose, and then frozen. We don't see any advantage to freezing, since a frozen product wouldn't be any better than the present dried one.

other stabilizers which have been used for this product include gelatin, gum acacia, and gum tragacanth. Since we do not know which you prefer, and since in any case strength of vegetable gums is somewhat variable, we cannot give you an exact formula. A few experimental batches at different levels will give the desired consistency.

As to homogenizing procedure, it is our opinion that the dispersing head you mention may not be creating sufficient shear to do a thorough job. Some manufacturers use a high-pressure valve-type homogenizer, others a close-clearance disk type, and still others a sort of high-speed colloid mill.

Makers of these machines are usually quite cooperative about renting test units. And we know of no better way to find out what effect a different homogenizer will have upon a given formula than to experiment with it.

In the final analysis, consistency and stability of the finished product will depend upon the joint effects of emulsifying, stabilizing, and homogenizing.

The proposed product containing chili sauce and pickle relish comes close to being a chutney. In fact, one formula involves simply adding three parts French dressing to one of chili sauce.

We expect that once you solve your first problem of French dressing composition and homogenizing, it will be a relatively simple matter to add to the homogenized dressing any desired quantity of chili sauce or relish. A large mixing vat with slow-speed double-motion agitator will doubtless be required for this final mixing.

If the resulting product is too thin or unstable, it will then be necessary for you to adjust the base product formula by omitting enough liquid to compensate for that in the chili sauce and relish ingredients.

Peeling Citrus Fruits

Question—Can you furnish me with information on peeling and sectionizing grapefruit and oranges?

Answer—Wash fruits and convey them through a hot water or steam bath to loosen the peel. Water temperature is maintained just below boiling. Time, depending on condition of fruit, is generally about 3 min. But it is important not to heat the fruit—only the peel.

Fruits are peeled by hand. Peeling-women cut off top of peel and pop fruit from its casing with a single motion.

Then fruits are conveyed in stainless steel baskets through a lye bath to soften the membrane or albedo. Strong sprays of cold water remove all

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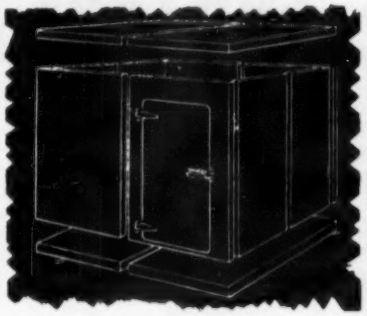

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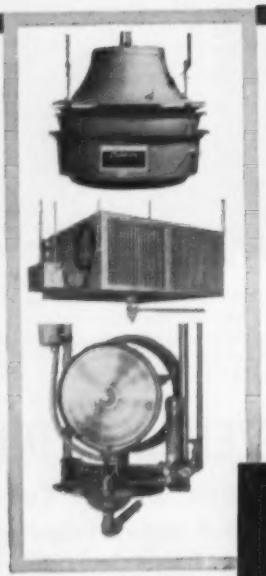

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UNITED STATES STEEL

traces of lye, then softened "rag." Lye solution is hot and is maintained at a strength of 1½ to 2½%.

Sectionizing is also carried out manually and requires a good deal of skill. Fruit is generally broken in half and a knife is inserted between segments, starting at the blossom end. A spindle device is sometimes used, and is said to speed up the operation. Machines have been developed to do the job mechanically, but most industry men feel that they are not adaptable enough to handle all sizes of fruit and still maintain a low breakage-rate.

Oranges follow the same procedure as grapefruit, but are generally recognized as being more difficult to process, due to their smaller size and tighter peel.

New Fish Stick Process?

Question—Is there an easier way—perhaps a continuous one—of making breaded, fried, and frozen fish sticks other than freezing the fillets in rectangular forms and then cutting them into stick-size with a band saw?

Answer—To the best of our knowledge there isn't. But there's no reason why you can't take a cue from meat packers who are now putting up beef, sausage, and ham sticks. What they are doing is machine-molding ground products into stick form. Ham and beef sticks are breaded, fried, and frozen in cartons.

Too, why not look into the possibility of grinding fish fillets through a ¾-¼-or ½-in. plate? Then load the ground fish into a sausage stuffer.

Q.—Do you have any suggestions on how we can reduce our unusually high motor-failure rate brought about by daily hosing of processing areas with high-pressure water?

A.—We suggest you look into the possibility of re-winding your motors with insulation made of Dow Corning silicones. Silicone-treated motors are reportedly resistant to heat and moisture.

(Your local meat packer might let you borrow the stuffer—but not take it out of his plant—some weekend).

If a rectangular shaped stuffing horn, instead of conventional round ones, were used, you could form the fish meat into stick-form.

Depending upon your research, you might use a wire cutter of guillotine-type knives to cut the extruded meat to size. To do this, you'll have to find out to what temperature the fish meat must be extruded. Or you may have to air-blast freeze the extruded product on a belt prior to cutting.

Useful New Books & Government Publications

Mouse in a Pop Bottle

PRODUCT LIABILITY CASES *By Frank T. Dierson and Charles Wesley Dunn. Published by Commerce Clearing House, Inc., 214 N. Michigan Ave., Chicago 1. 1955. 1182 pages. 6⅝ x 9⅞ in., cloth. Price:* $12.

A beer bottle explodes. A woman opens a bottle of pop and finds a mouse. Retailed salami is found to contain trichinae. Who is responsible?

This book provides a clue to the decision of the courts in landmark cases involving food, drugs and cosmetics. All have played a large part in establishing legal precedents. The basic principles involved serve to bring out the essential background for the high standards now in effect in the food industry.

Handy as a general study of product liability or as a reference to specific cases, the book is a "must" for food processors.

Readily identified by headlines, the cases are indexed in both alphabetical and jurisdictional case tables, including full citation and year of decision.

Introduction to Microbes

MICROBIOLOGY. *By Ernest A. Gray. Published by Philosophical Library, 15 E. 40th St., New York City 36. 1955. 175 pages. 4¼ x 7⅛ in., cloth. Price:* $3.75.

Not designed to compete with the standard reference books on microbiology, the book is instead intended to serve as a general introduction to the topic. The author assumes that the reader has no knowledge of the science. He attempts, through narrating the relationships of organisms and discussing the advances in the science, to impress on the reader the importance of microbiology in today's world.

Sections are devoted to culture and control of micro-organisms, bacteria, yeasts, molds, fungi, algae, and many others. Illustrated, the book includes a bibliography and index.

How to Manage

DEVELOPING YOUR EXECUTIVE SKILLS *by Auren Uris. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City 36. 1955. 270 pages. 5½x8¼ in., cloth. Price:* $4.50.

Based on latest techniques in business and the most recent findings of the Research Institute of America, this book is directed at helping executives develop and sharpen their management skills. Planning, problem solving, correspondence, communication, and many of the other problems that face today's executives are discussed with interest and authority.

Author is editor of the Human Relations Division of the Research Institute of America and is therefore in close and practical contact with the problems of modern business.

Guide to Dehydration

DRYING AND DEHYDRATION OF FOODS *by Harry W. von Loesecke. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22. 1955. 300 pages. 5¾x8½ in., cloth. Price:* $7.50.

Completely revised, this second edition of a classic work now includes most of the great strides taken in the past 20 years in the field of food dehydration. Such topics as dehydration equipment, procedures, plant sanitation, nutritive values, packaging and storage, and rehydration methods are discussed in detail. Of great interest to food industry management, the book provides a ready reference to all aspects of food drying.

Major dehydrated products are discussed individually with detailed information on harvesting, irrigation, preparation, drying, sorting and processing.

Charts and diagrams as well as selected references add to value.

Booklets and Reports

STRENGTHENING MANAGEMENT FOR THE NEW TECHNOLOGY (*No. 178 in General Management Series*). *Published by American Management Assn., New York City 36. 64 pages, paper. Price:* $1.75 ($1.00 *to members*). Discussion of organization, automation, and management developments.

THE FAIR TRADE QUESTION (*No. 48 in Studies and Business Economics*). *Published by the National Industrial Conference Board, New York City 22. 112 pages, paper. Price:* $3.00. Discussions by twelve leading economists and attorneys.

THE ABC OF CANNED FOODS. *Published by National Canners Assn., Washington 6, D. C. 245 pages, paper. Price:* $1.00. Comprehensive history of the industry as a whole and detailed account of the background and current status of some leading products.

RADIATION STERILIZATION OF FOODS. *Published by Food and Container Institute for the Armed Forces, Chicago. 30 pages, paper.* Symposium presented before the Research and Development Associates, Food and Container Institute, Inc.

FE REPRINTS AVAILABLE

Listed below are special sections, flowsheet book, and articles from past issues of FOOD ENGINEERING which are available in reprint form. Single-copy prices are listed. For orders of 20 or more, there is a 25% discount. You order the reprints by circling the corresponding numbers on the Reader Service Coupon, inside the back cover. You will be billed when your order is filled.

1. Meat Special $1.25

Contains a series of 9 articles: (1) Cold Sterilization Problems. (2) New Continuous Lard Process. (3) Progress in Meat Dehydration. (4) High-Speed Chub Packaging. (5) Atomic Irradiator Designed. (6) Improvements in Unit Tasks. (7) New Processes for Old Products. (8) Map Unravels Delivery Snags. (9) Saves 50% of Retort Steam.

2. Dairy Special $1.25

Ten timely articles are included: (1) Dairymen Face Challenging Changes. (2) New Processes for Instant Dry Milk. (3) Controls Presage Automatic Dairy. (4) Save With Cleaned-in-Place Pipes. (5) Bi-Oxidation Solves Waste Problem. (6) Cheese Keeps in Antimycotic Wrap. (7) Plastic Tank for Milk Trailers. (8) Bulk Handling Aids Processors, Too. (9) Advanced Dry Milk Flowsheet. (10) "Tracers" Detect Foreign Fats.

3. Ingredient Special $1.25

Ten articles helpful in improving product formulation: (1) Chemicals Still a Question. (2) Role of Antioxidants. (3) MSG —Unique Enhancer. (4) Tailored Salts Add Values. (5) Ascorbic Acid Betters Meats. (6) Dry Solubles Are Versatile. (7) Sugar Types and Uses. (8) Latest on Low Calories. (9) True-Fruit Hows and Whys. (10) Stepping Up Nutrition.

4. Packaging Special $1.25

Six articles of practical value: (1) Flexibles Are Revamping Packaging Pattern. (2) How To Avoid Damage in Shipping. (3) Bundling Frozen Foods. (4) One-Portion Packets. (5) Automatic Packaging Line. (6) Paper Vs. Glass.

5. Canning Special $1.25

Eight articles on significant developments: (1) High Frequency Looms as Improved Cooking Method. (2) New Twist in High-Short Retorting. (3) Full-Flavor Concentrates by New Recovery Technique. (4) From Orchard to Cannery—Under Water. (5) At Gerber's Quality Control Reigns Supreme. (6) Bulk Brining Spells Big Benefits to Canner. (7) Top-Notch Tomato Processing Operation. (8) Dual Tomato Cannery—How It Ticks.

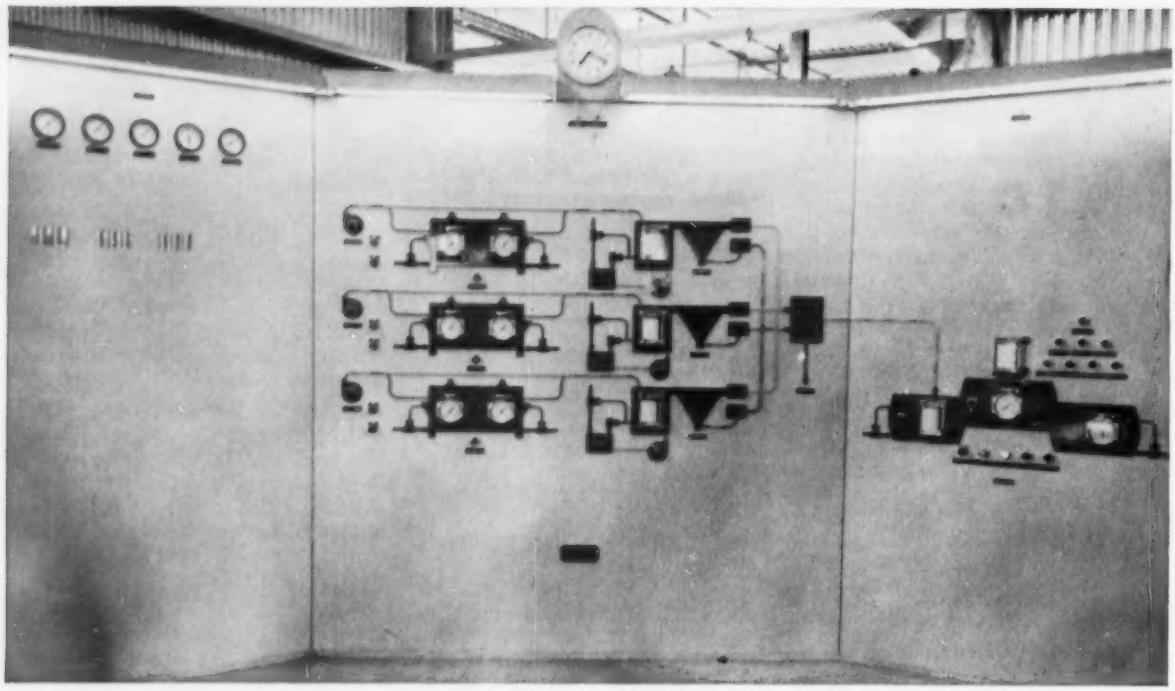
6. Book of Flowsheets $2.00

Few copies of 1949 edition still available. It contains 130 process charts covering a wide variety of food manufacturing operations. Charts are accompanied by brief descriptions of the processes.

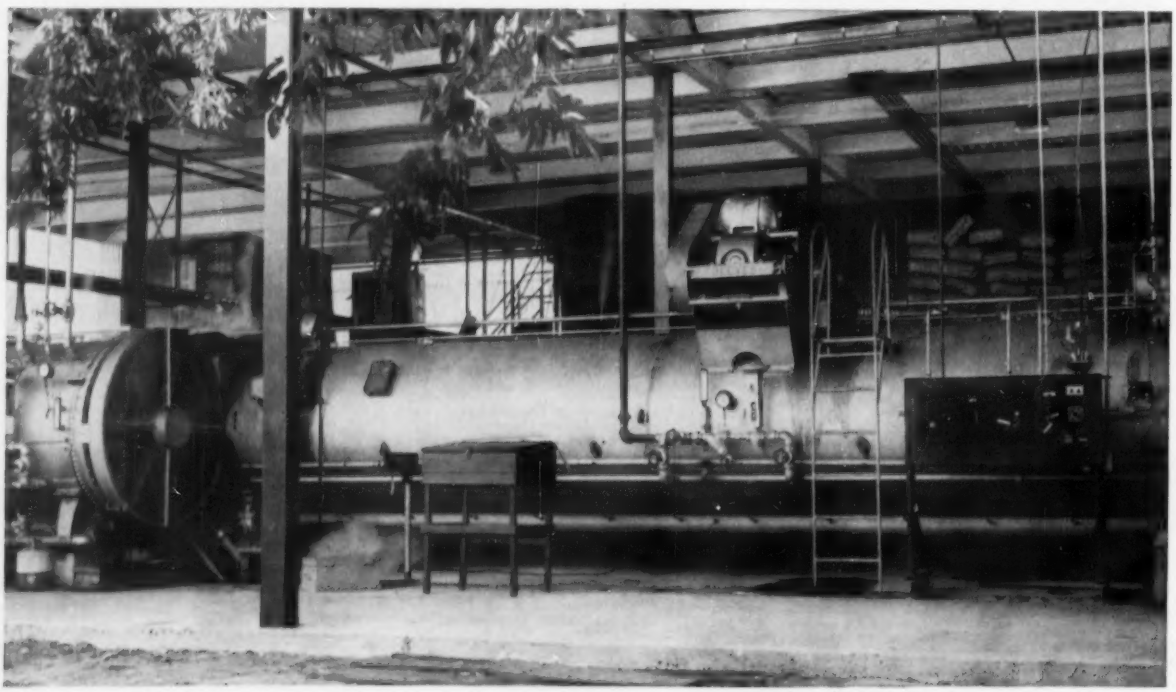
7. Preventive Maintenance $0.50

An 8-pager packed with information that will help to minimize costs, reduce down-time, and promote quality through more effective maintenance.

Now ! PUSH-BUTTON



The graphic panel shown above gives a complete picture of the entire canning process at a well-known mid western cannery. TRANSET Indicators at left show Blanching temperatures, recorders in the center keep track of the Grading operation and the instruments on the right record temperature and pressure of the Sterilizing Section (Pre-heating, Cooking, Cooling). Lower photograph shows Pressure Cooker-Cooler units at this model canning plant.



CANNING IS HERE !

Taylor System brings automation to the Canning Industry for the first time

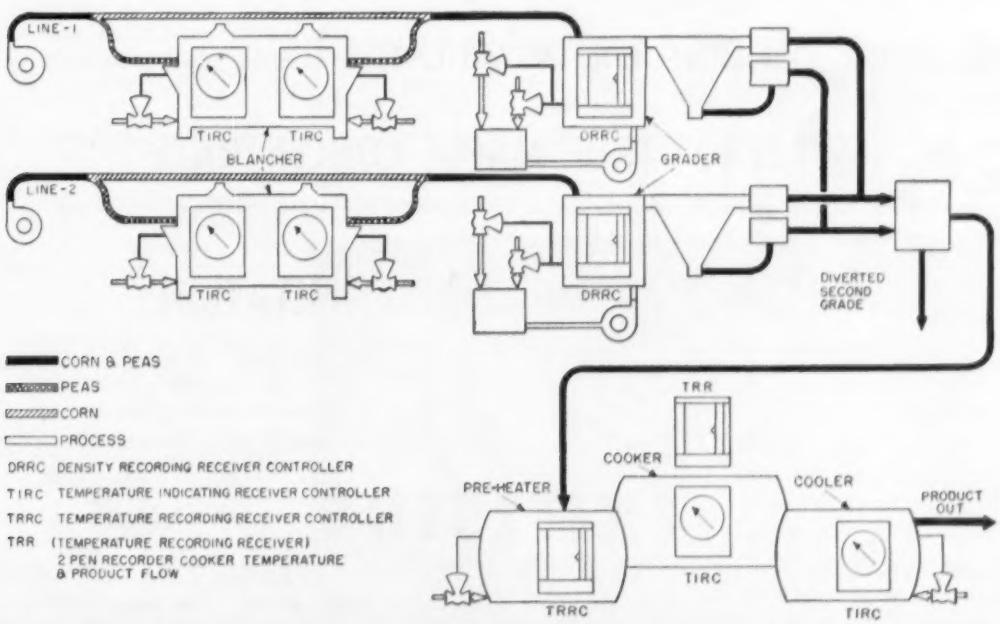
THE PHOTOGRAPHS on these pages, taken at the plant of one of our more progressive mid-western canners, show the first completely automatic control system in the industry. It brings to food processing the advances in automation that have been developed in the chemical, petroleum and other continuous process industries in recent years.

As shown by the drawing below, Blanching, Grading, Preheating, Cooking and Cooling are all under complete, continuous, automatic control. A graphic panel, located at a central point schematically presents the complete canning process, thus an operator at the control center can constantly evaluate and control the process. Measurement is by TRANSAIRE* Temperature Transmitter. Control, indication and/or record of temperatures and pressures at the various stages are accomplished by means of the Taylor TRANSET* System of miniature instrumentation in which TRI-ACT* Controllers, and TRANSET Indicators and Recorders, all plug in to the graphic panel.

Among the many benefits accruing from this fully automatic control system are: *closer quality control; considerable savings in the consumption of steam, water and air; absolute minimum of operator attention; a convenient intelligence center for supervision.*

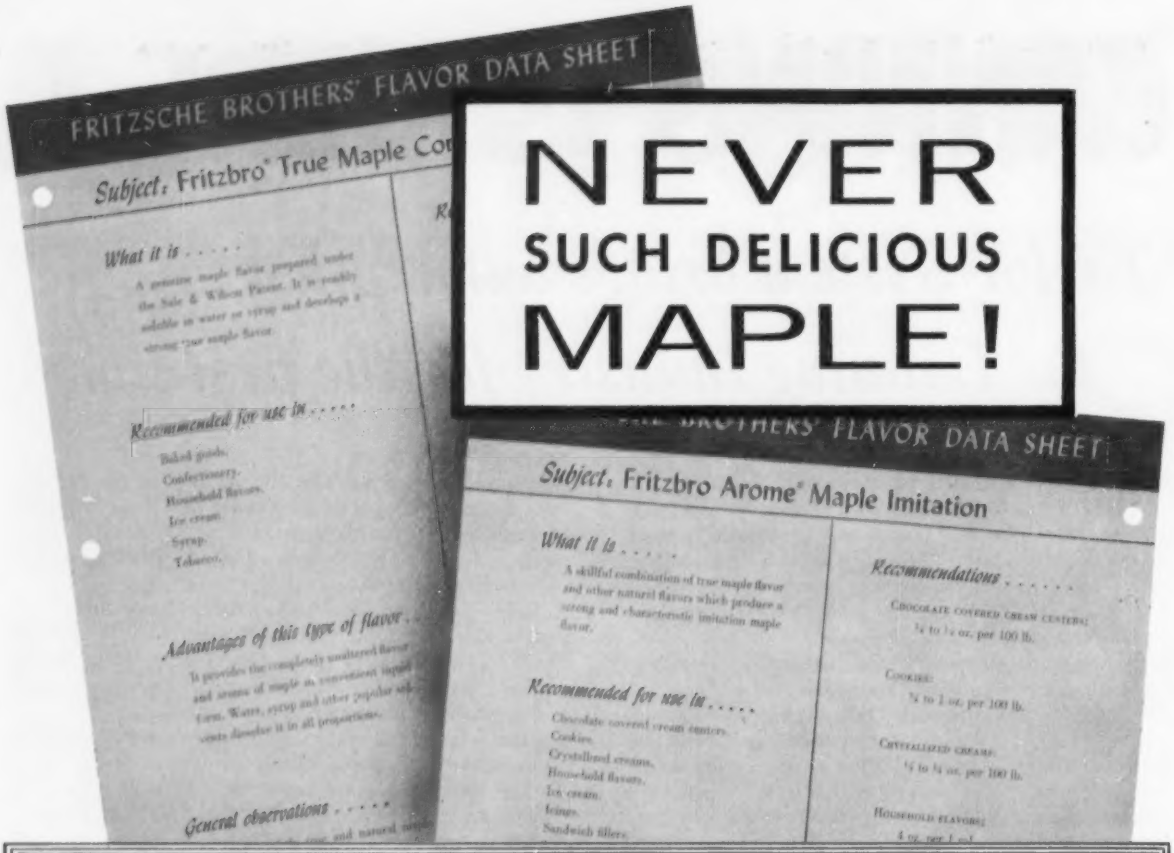
See this latest development in food processing control demonstrated at the Canners Show, and ask your Taylor Field Engineer or write for further details. Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

*Reg. U.S. Pat. Off.



Taylor Instruments MEAN ACCURACY FIRST

See this system demonstrated at the Canners Show – EXHIBIT SPACE C-14


FRITZSCHE BROTHERS' FLAVOR DATA SHEET
Subject: Fritzbro® True Maple Co
What it is . . . . .
Recommended for use in . . . . .
Baked goods.
Confectionery.
Household flavors.
Ice cream.
Syrup.
Tobacco.
Advantages of this type of flavor . . .
General observations . . . . .
NEVER
SUCH DELICIOUS
MAPLE!
FLAVOR DATA SHEET
Subject: Fritzbro Arome® Maple Imitation
What it is . . . . .
A skillful combination of true maple flavor and other natural flavors which produce a strong and characteristic imitation maple flavor.
Recommended for use in . . . . .
Chocolate covered cream centers.
Cookies.
Crystallized creams.
Household flavors.
Ice cream.
Icings.
Sandwich fillers.
Recommendations . . . . . .
CHOCOLATE COVERED CREAM CENTERS:
¾ to 1½ oz. per 100 lb.
COOKIES:
¾ to 2 oz. per 100 lb.
CRYSTALLIZED CREAMS:
½ to ¾ oz. per 100 lb.
HOUSEHOLD FLAVORS:

WHETHER GENUINE OR IMITATION, you have your choice of two of the finest maple flavors ever offered, in

FRITZBRO® TRUE MAPLE CONCENTRATE

a genuine maple flavor prepared under the Sale & Wilson Patent which provides the natural, unaltered flavor and aroma of maple in convenient liquid form; and:

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a skillful combination of true maple flavor and other natural flavors to produce a strong characteristic imitation maple effect. These specialties may be used wherever the need is for fine, smooth maple effects and where solubility, convenience, economy and ease of handling are matters of important consideration. These flavors are recommended for use in confectionery manufacture, baked goods, household flavors, ice creams, syrups and tobaccos. For free Flavor Data Sheets describing these materials and/or working samples, write us on your letterhead indicating the use to which requested sample will be put.

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

NRC Clears 'Non-Calorics'

"There is no evidence that use of the non-nutritive sweeteners saccharin and cyclamate for dietary purposes is hazardous," states National Research Council's Food Protection Committee in a final report.

Group began investigation of cyclamate and saccharin as part of an NRC study of diatetic foods requested by the Food & Drug Administration.

During tests, humans were fed as much as 7g. of cyclamate per day (equivalent to ½-lb. of sugar), with no untoward effects observed.

ATA Forms 'Frozens' Arm

Special attention will be given frozen food industry shipping needs through establishment of a new division by the American Trucking Assn.

Designated the Refrigerated Carrier Div., and with Sidney Alterman, president of Alterman Transport Lines, as chairman, the group will provide a central information agency.

Main aims will be to develop improved mechanical equipment, devise better handling methods, and maintain close contact with frozen food men for fast solution of problems.

Plans Controls Conference

Instrumentation in the food processing industry will receive particular coverage at a technical conference sponsored by Armour Research Foundation at Illinois Institute of Technology in Chicago, January 25-26.

Fourteen speakers will cover such subjects as automation techniques, future trends in instrumentation, new measurement methods, a discussion of the tie-in between weighing instruments and computers, and application of metal counting equipment for counting, inspecting, and control.

Dairy, Juice Firm Join

Formation of a new company, Halco Products Inc., to manufacture and distribute fresh orange juice is announced by H. P. Hood & Sons, Boston.

The large New England dairy is joining Babijuice Corp. of Florida in the endeavor. A new plant in Orlando will handle processing. Distribution begins this month, according to Hood.

Latest USDA Research Reveals Best Bread Freezing Methods

New facts on bread freezing are coming to light, as a result of research now underway at USDA's Western Utilization Research Branch (in cooperation with the Refrigeration Research Foundation).

Best news to date is that frozen-and-thawed bread will not stale any faster than fresh, unfrozen bread—if freezing and thawing processes are carried out properly.

Other findings show that air velocity and position of the loaf in the freezer are all important in preserving the unwrapped product. In freezing wrapped bread, temperature is the most important factor.

Researchers say bread is best when frozen as soon as possible after leaving ovens. Also, crumb firmness is affected by freezing time more than by the defrost period.

For long storage periods, bread should be held at not over 0 F., since crumb firming continues slowly at temperatures just below freezing.

A strong, moisture-vapor-resistant wrapping material is essential, because packaging is subject to shrinking and increased strain during freezing.

Defrosting involves a compromise in humidity, say the scientists. Excessive condensation on wrappers is caused by such moisture. But it also speeds defrosting rate—a desirable feature—because moist air has greater heat-carrying capacity.

Present investigations into moisture distribution in unfrozen, frozen, and defrosted loaves will shed much light on effects of freezing, storage, and eventual defrosting.

At present, it is known that moisture distribution in the frozen product is about the same as in a freshly baked loaf. Neither freezing nor thawing appear to disturb this distribution balance.

Discloses New-Type Can

A new food can featuring aluminum coating and welded seams has been unveiled by American Can Co.

So strong is this latest tinless container, says Dr. Randall Royce, manager, Canco Atlantic Div. research laboratories, that can walls will burst before welded seams separate.

Aluminum coating on both body and ends is more durable than tin, he continues, and insides of cans are coated with special enamels to give additional protection to the canned products.

New Packaging Eases Trail to South Pole

U. S. Navy's 1955-59 Antarctic research expedition will be better fed than any previous exploration team. Contributing to their well-being is a variety of the latest concentrated, powdered, and dehydrated foods. They are protected from the 50-below temperatures by a special package composed of pouch paper (Riegel) coated with polyethylene and laminated to an aluminum foil.

More Pressure-Dispensed Foods to Come From Packaging, Sterilizing Advances

Food aerosols—now limited to whipped cream—will soon include semi-solid spreads, salad dressings, condiments, and sauces, says W. Earl Graham, research manager, Crown Cork & Seal Co.

New advances in pressure packaging plus aseptic canning methods are keys that will unlock development of these non-refrigerated products.

Chief drawback is the fact that sensitive foods must not be mixed with the propellant. Mr. Graham suggests an inner plastic bag to contain the product and thus lick problem. If a non-permeable film is used and firmly sealed around valve, gas pressure will force product out without actually mixing with it.

Some re-formulation will be necessary, he indicates, particularly with very viscous foods. In some cases, stabilizing agents can insure preservation. On other products, aseptic canning techniques, now perfected, will eliminate necessity of refrigeration.

Quick-Freeze, Antibiotics Alter Slaughtering Outlook

Injection of antibiotics into living animals—to produce meats pre-treated to delay spoilage—was detailed by Dr. Herbert G. Luther, Chas. Pfizer & Co. at American Meat Institute meeting.

Dr. Wilbur H. Miller and Burton F. Bowman, American Cyanamid Co., sketched application of an Aureomycin dip for preserving poultry, meat, and fish (for full story see p. 43).

To further change present picture, other panel experts predict that prepackaged, quick-frozen meats will command from 15 to 50% of the market within 5 years (present market is 5%).

These men declare wide distribution will cut costs of processing and handling frozen product to less than that of fresh meat—thus offering possibility of lower prices as well as increased convenience to consumers.

Robot Spots Tube Flaws

The food industry can count on even better tubing now that Carpenter Steel Co., Union, N. J., has put a new electrical device to work. It automatically detects flaws in austenitic stainless steel tubing, and will spot variations in chemical composition, wall thickness, and outside and inside diameters. Audio-visual signals alert operator as tube passes through tester.

Cuts Mushroom Diseases

Four common diseases that reduce yields and cause blotching and spotting of mushroom crops can be controlled by simply chlorinating irrigating water, reports the USDA.

Just enough chlorine is added to provide 100 ppm. It will neither discolor mushrooms, nor leave any flavor. And there are no toxic residues.

Sweeps Safety Competition

Truck fleets of Southern Dairies, Inc., southeast Sealtest organization, have won three of the six 1st-place awards in the National Safety Fleet Contest.

Further, this Charlotte, N. C.-based company took three out of six 2nd-place prizes.

A total of 92 dairy truck fleets, adding up to over 10,000 vehicles, took part in the competition.

Frozen Fruit Sugar Role Probed By Oregon State

Preservation of frozen fruit by sugar will be the object of continued research at Oregon State College. Renewal of a $10,000 grant by Sugar Research Foundation, Inc., N. Y. C., supports the endeavor.

Primary objectives, according to Dr. H. W. Schultz, OSC food technology head, are to determine how sugar protects fruit from air, what sugars do the job most effectively, what methods are most practical, and what amount of sugar is necessary.

Cane, beet, and corn sugars are used in the investigations that are scheduled this year on strawberries, cherries, and peaches used in manufacturing preserves, ice cream flavors, and toppings.

Sugar OK in Carton Juice

As a result of Florida court action, producers of cartoned orange juice will be permitted to add sugar to their product and still label it "fresh".

Golden Gift, Inc., Deland, Fla., was recently granted a permanent injunction barring the Florida Citrus Commission from applying a regulation prohibiting additives to chilled juices.

Change was necessary, contended President Young of Golden Gift, because at certain times in the season the Florida oranges do not contain enough sugar to meet required solids (sugar) standards of 10.5 Brix.

Nation's Canners Convene

Dr. L. G. MacDowell
Wins Citation

Themed by the 1956 slogan "The Canning Industry's Greatest Show on Earth", the 49th Annual Exhibit of the Canning Machinery & Supplies Assn. and the National Canners Assn. convention gets underway in Atlantic City, N. J., Jan. 18.

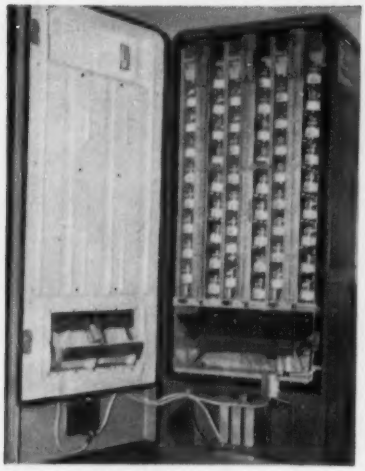
Highlight of this event will be ceremonies honoring the 50th anniversary of the first pure food and drug law. Observances will mark NCA's close association with the regulatory movement since its earliest beginnings, reports George B. Morrill, Jr., NCA president.

Slated for distinction is Dr. Louis G. MacDowell, inventor of the frozen orange juice concentrate process. He will be presented with this year's Forty-Niner Service Award, states M. R. Feeney, president of the special canners group.

GMA Elects Officers

Paul S. Willis was elected president of Grocery Manufacturers of America for his twenty-first consecutive term at the recent GMA annual convention in New York City.

Other officers appointed were: W. H. Vanderploeg, Kellogg Co., first v.-p.; Walter S. Shafer, Armour & Co., second v.-p.; Dan Gerber, Gerber Products Co., third v.-p.; O. E. Jones, Swift & Co., secretary; and B. E. Snyder, R. B. Davis & Co., treasurer.



Serves Hot Soup

Latest addition to the coin-operated serve-yourself line is this hot soup vending machine, developed by Vendo Co. and Campbell Soup Co. Unit holds 210, 8-oz. cans in three varieties. Heat is thermo-controlled to deliver product at 150 F.

Hors d'Oeuvres

▶ Top executives last year failed to get raises proportionate to those for hourly workers. Won't make too many people weep. Won't get you better executives, either.

▶ **At Lewisohn Stadium concerts, the Brahms, Beethoven, and Bach audiences prefer malt liquors to soft drinks. Apparently the "long-hairs" like to weep in their beer.**

▶ Motorists approaching school zones often see signs with a "slow" warning on the front and picture of a Coca-Cola bottle on the back. Here's one kind of "commercial" we could use more of.

▶ **And likewise for Jomar signs telling weary drivers that the local police will serve them a free cup of coffee. But does this mean that some people don't give a dime for their lives?**

▶ A new food delivery truck is fast enough for big-city expressways. It keeps the driver one car length ahead of death.

▶ **Chlorophyll has dropped from the limelight. Apparently too many claims for the deodorant needed deodorizing themselves.**

▶ A third sex—the neutral gender—is said to be increasing among the aged due to inadequate hormone secretion. Hope the geriatric dietitians can correct this during our generation.

▶ **At the Canning Show in Atlantic City, exhibit aisles will be named after foods, like fruits and meat. You can see the whole show by following recipes for fruit salad and hash.**

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DRYERS!

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COMPANY OF PENNSYLVANIA
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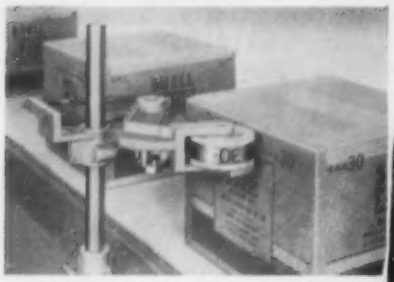
Low-cost marking attachment pays for itself in weeks... saves thousands of $ every year



◀ **ROLACODER twin-action markers ... for imprinting codes and lot numbers on 2 or 4 sides of cases simultaneously ... without requiring cases to be turned.**

Friction-driven ROLACODER markers do your marking automatically... save cost of manual stencilling or stamping. Designed for easy do-it-yourself installation on existing conveyor lines, case-sealers, etc. They use quick-change rubber type or dies, hold 8-hour ink supply.

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▲ **ROLACODER single-side marker for accurate spot imprinting of brand names, varieties, code-dates, lot numbers on cases, cartons, fibre drums, bags, etc.**

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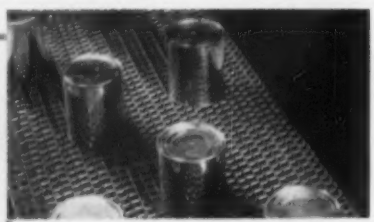
In Canada: **RICHARDSON AGENCIES, LTD., Toronto & Montreal**

Automatic **CODING, MARKING, IMPRINTING MACHINES**

PROCESS PACK SHIP



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LA PORTE FLEXIBLE STEEL CONVEYOR BELTING

does a better job!

A shot in the arm for every food handling operation from loading hopper to shipping, versatile La Porte conveyor belting gives top performance with minimum maintenance and repair.

Rugged galvanized steel construction for longer service. Open mesh feature permits easier sterilizing with steam or scalding water—allows circulation of air or liquids around products in process . . . and prevents fruits, vegetables and other products from rolling off.

Stretch-free FLEXIBILITY eliminates jump or slippage that wears belt edges and pulley stands. Provides perfectly flat, silk-smooth ride for containers empty or full. Choose La Porte for tops in performance—and *dependability.*

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BOX 124 ***La Porte, Indiana***

"Cow-Injection" Seen Way To Cut Disease in Man

A new disease-prevention plan for immunizing whole populations through use of "protective milk" is announced by U. of Minnesota researchers Dr. W. E. Peterson and Dr. Berry Campbell.

Method involves injection of disease-producing virus and bacteria into milk-cow udders. Cattle react by manufacturing large quantities of antibodies, which are released into the milk. These are not destroyed even when milk is pasteurized or dried.

While stressing tremendous amount of research still needed to make process available to the public, investigators state that method would make it unnecessary to vaccinate those humans who consume stipulated amounts of the protective milk. The immunity factors do not alter milk composition in any way, and no disease organisms are introduced into the product.

Wins Food Chemistry Prize

Dr. Ralph M. Hixon, dean of Iowa State College graduate school, is first recipient of a new food chemistry award given by the American Chemical Society's Kansas City Section.

He won the prize for outstanding work in starch chemistry.

The new award was established by Kenneth A. Spencer, president of Spencer Chemical Co., Kansas City.

QC, Instrument Courses

Short courses in Quality Control by Statistical Methods are offered this year at: Georgia Institute of Technology, Atlanta, Mar. 5-13; and U. of Illinois, Urbana, Mar. 19-29.

Also slated is an Instrument Short Course at Los Angeles Harbor Junior College, Wilmington, Calif., Jan. 26-27; and three QC conferences, scheduled by American Bottlers of Carbonated Beverages in Washington, D. C., Jan. 23-24, New Orleans, Jan. 30-31, and Chicago, Feb. 2-3.

Speedier Cheese-Making

A 10-20% time saving in the manufacture of cottage cheese, cultured milk, and other dairy products using bacterial starters is foreseen as the result of a study at Oregon State College.

Here, amount of peptides—combinations of amino acids—was found to vary widely in milk from 50 test cows. And this variation was shown to affect rapidity with which fresh whole milk grows lactic acid bacteria.

Next step is to study effects of add-

ing inexpensive, commercially-manufactured milk peptides to whole milk in the manufacture of cultured products.

If proved on an industrial scale, findings could offer two major advantages: General speed-up in manufacture of cultured products, and greater uniformity in the fermentation process.

Briefly . . .

● **LABORATORIES in food processing plants for research, quality control and new product development have increased over 20% during the past 5 years, estimates J. O. Bengston, president, Chicago Apparatus Co.**

● TEN SCHOLARSHIPS, worth $60,000, have been established by McGraw-Hill Publishing Co., announces Donald C. McGraw, president. Intended for students in science, engineering, and other professions, grants will be administered by the National Merit Scholarship Corp.

● **MEAT CONSUMPTION, already high, has shot up 11% more this past fall, reports J. A. Logan, president, National Assn. of Food Chains.**

● FROZEN PEACH PACK is largest since 1946, says National Assn. of Frozen Food Packers. Even with the southern pack virtually wiped out, preliminary figures put '55 processing at 46,900,000 lb. —29% higher than 1954 (36,380,000 lb.).

● **MAINE'S SARDINE PACK is smallest in 15 years, says Fish & Wildlife Service, and will amount to no more than 1,230,000 standard cases when all figures are in.**

● MECHANICAL REFRIGERATION railroad cars are multiplying. Pacific Fruit Express plans construction of 200 more of the super-reefers, which will bring its fleet of such cars to 712, announces K. V. Plummer, company v.-p. and general mgr.

Action on Standards

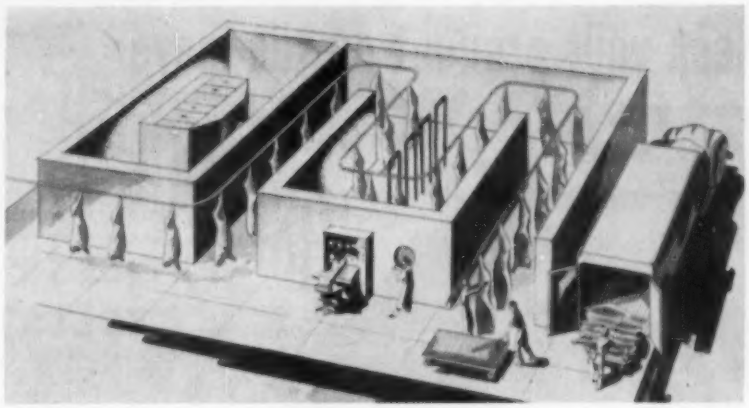
Following actions have been taken by Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register*.

Grape juice, frozen concentrate, AMS proposed U. S. Grade Standards, *F.R.* Dec. 6, p. 8962.

Sweet cherries, AMS proposed revision U. S. Standards, *F.R.* Dec. 8, p. 9017.

Orange juice, canned, AMS proposed revision U. S. Grade Standard, *F.R.* Dec. 8, p. 9018.

Grapefruit juice, dehydrated, AMS proposed U. S. Grade Standards, *F.R.* Dec. 8, p. 9020.



New Concept for Preserving Meats

One way in which storage life of fresh meats may soon be lengthened is shown in this artist's drawing. Fission products, produced in reactor (left), circulate through pipes (center). Atomic radiations kill spoilage-causing bacteria. Process is one of several procedures now being weighed for their commercial practicality at Atomics International (North American Aviation), Los Angeles, under contract from the Quartermaster Corps.

Carcass beef, AMS proposed amended U. S. Grade Standards, *F.R.* Nov. 15, p. 8477.

Food colors, FDA decertification of FD&C Orange No. 1, FD&C Orange No. 2, FD&C Red No. 32, effective Feb. 14, *F.R.* Nov. 16, p. 8492.

Antibiotics as food additives, FDA policy statement, *F.R.* Nov. 30, p. 8776.

Aureomycin antibiotic, FDA tolerances for use on dressed poultry, *F.R.* Nov. 30, p. 8776.

Shell eggs, AMS proposed amendment of U. S. Grade Standards, *F.R.* Dec. 3, p. 8933.

On beans, broccoli, brussel sprouts, cabbage, cauliflower, collards, horseradish, kale, kohlrabi, lettuce, mushrooms, mustard greens, radish, rutabagas, turnips, exemption from tolerances of Allethria, *F.R.* Nov. 19, p. 8567.

Insecticide tolerances:

On celery and tomatoes, of Phygon, *F.R.* Nov. 29, p. 8748.

On apples, peaches, pears, citrus and plums, of chlorophenyl, chlorobenzenesulfonate, *F.R.* Dec. 10, p. 9182.

On grapes, olives, sugar beets, tomatoes, almonds, cottonseed, pecans, and walnuts, of EPN, *F.R.* Nov. 30, p. 8776.

Proposed insecticide tolerance:

On cranberries, plums, prunes, beets, turnips, rutabagas, sugar beets, horseradish, parsnips, collards, kale, mustard greens, spinach, swiss chard, peppers, pimentos, cowpeas, oats, rye, barley, wheat, rice, sorghum, grain, buckwheat, pecans, walnuts, hazelnuts, hickory nuts, almonds, meat, and sugarcane, of Toxaphene, *F.R.* Nov. 29, p. 8760.

Schedule of Events

January '56

15–19—U. S. Brewers Foundation, annual convention; Roosevelt Hotel, New Orleans.

18–21—National Canners Assn., Canning Machinery & Supplies Assn., overall convention and exposition; Convention Hall, Atlantic City, N. J.

23–26—Plant Maintenance & Engineering Show; Convention Hall, Philadelphia.

24–26—National Macaroni Mfrs. Assn.; Hotel Flamingo, Miami Beach, Fla.

24–27—American Management Assn., general management conference; Hotel Fairmont, San Francisco.

29–F1—National Frozen Food Distributors Assn., convention & exposition; Belmont Plaza (foods) and Waldorf-Astoria (equipment & supplies) Hotels, New York City.

30–F1—National Dairy Council, annual meeting & winter conference; Hotel Roosevelt, New York City.

30–F2—United Fresh Fruit & Vegetable Assn.; Hotel Roosevelt, New Orleans.

February

10–12—Institute of American Poultry Industries, fact-finding conference; Municipal Auditorium, Kansas City, Mo.

15–17—American Management Assn., personnel conference; Palmer House, Chicago.

16—Dairy Products Improvement Institute, annual meeting; Hotel Commodore, New York City.

18–26—International Food Show; former Wanamaker store, New York City.

March

1– 2—Dairy Industries Supply Assn., annual meeting; Hotel Commodore, New York City.

5– 8—American Society of Bakery Engineers, annual meeting; Edgewater Beach Hotel, Chicago.

15–16—Institute of Food Technologists and Southwest Research Institute, international symposium—physics in the food industry; Plaza Hotel, San Antonio, Tex.

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WRITE FOR ILLUSTRATED CATALOG E-55

Automatic Palletizer

—Continued from page 82

to the rear. They advance on the primary conveyor to a keg-alternating control that shunts every other barrel to the secondary. Latter carries them around a 180-deg. return bend so that tap holes on all barrels face outward as they go to the palletizer.

The keg-alternating mechanism consists of a deflecting arm controlled by a 4-way valve. This valve is actuated by a solenoid through a limit switch. In its closed position, the deflector permits a keg to travel straight through on the primary conveyor. Then this keg contacts a limit switch that opens the arm.

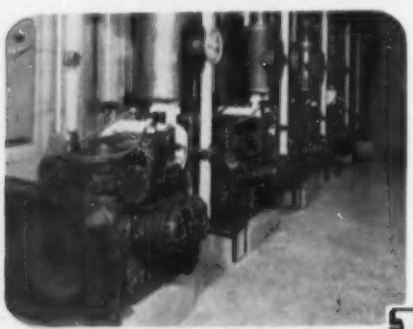
Thus, the next barrel is shunted to the secondary conveyor by the extended deflector. In transferring, it depresses a pivot plate that actuates another limit switch to retract the arm. The succeeding keg then proceeds along the primary conveyor to repeat the cycle.

Barrel Transfer

The primary conveyor feeds directly into a keg-transfer unit. Meanwhile, the secondary returns shunted kegs (via the 180-deg. bend) to a second

TRADE FRICK MARK® Refrigeration

Carries the entire cooling load at the great new West Side Plant of the Detroit Creamery Co., handling 30,000 gallons of milk daily.



Five Frick "ECLIPSE" Compressors at Detroit Creamery Co.

Here five Frick "ECLIPSE" compressors make 60,000 pounds of ice at night for chilling water, cool two huge milk storage rooms, and refrigerate five cold-wall storage tanks. Installation by the Michigan Ice Machine Co., Frick Distributors at Detroit.

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transfer unit of the palletizer.

At this point, barrels are in position for transfer to the accumulation skids, which are at right angles to the conveyors.

Transfer is accomplished by a unit that carries each barrel from the keg chain across two half-round tracks, one stationary, the other retractable. The latter is held in its upper position until the unit completes its forward stroke, then is lowered to place the keg gently on the skids. With weight of the keg removed, track returns to its upper position and carriage retracts to receive the next barrel.

Aided by overhead friction belts, transferred barrels roll toward retractable stops at the reciprocating carriage. It is to be noted that tap ends of barrels still face outward.

A loading cycle starts with the hydraulic piston in its lowest position, in which the piston table is below the base-pallet conveyor. As previous load leaves the machine, a base pallet is fed to the piston table, which then rises to loading height.

A tier of four barrels is transferred from skids to pallet by the reciprocating carriage, which forms an extension of the skids at the same pitch. This unit bridges the gap across the pallet in its forward stroke. As barrel stops retract, four kegs roll along the carriage and position themselves above pallet cutouts. Barrels are seated in the cutouts as the carriage returns.

Four overhead limit switches assure that all four kegs have been transferred and are properly seated before the cycle continues. Unless each keg contacts its corresponding switch, the carriage does not return for the next tier of barrels. This safety device prevents jamming of the machine, which would occur if an intermediate pallet were subsequently placed on a base of less than four barrels, and loaded.

With electric circuits closed, the piston lowers to receive an intermediate pallet atop the four kegs on the base pallet. Then a second tier of four barrels is transferred onto the intermediate section. Piston again lowers to receive the third pallet load.

A full pallet load leaves the unit on a drag-chain conveyor and is transferred to another conveyor (at right angles), from which it is removed by fork truck and placed in refrigerated storage. Or, if required for immediate shipment, it continues on to the end of the conveyor and is loaded directly into a closed-body trailer by fork truck.

Over-the-Road Trailers

This brewery supplies its branch depots by a fleet of 18 lightweight tractors and 30 aluminum closed-body trailers specially equipped for handling palletized loads. Of the 30 trailers, 23 are tandem-axle units 33 ft. long, and 7 are single-axle trailers 28 ft. long.

Special equipment for handling palletized loads consists of two rigs of 3½-in.-dia. floor-mounted wheels. Each set has three rows of wheels, which extend the length of the truck body and are separated by a ¾-in. plywood partition.

The right-hand set of wheels are spaced 3½ in. apart, while those on the left have 7-in. spacing. Partition is 4 in. off center and toward the right. Therefore, rollers in the right-hand set are 4 in. closer than those on left.

Purpose of this arrangement is to permit direct loading of 36x44-in. pallets by a fork truck operating at floor level. Pallets go in on the right side with their 44-in. dimension lengthwise, and on the left with the 36-in. side lengthwise. In this way, 16 pallets fit on a 28-ft.-long body—9 on the left side and 7 on the right.

In loading the truck, pallets are simply placed on rollers and pushed into position. In unloading, they are pulled from the rear and picked off by fork truck.

End (Resume reading on page 85)

SPEED...
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SAVINGS...
IN PACKAGING Cottage Cheese, Sour Cream, Potato Salad, Honey, Cream Cheese, Gelatine Salads
You'll speed up production, save a fortune on labor costs, and have better, more sanitary packages, with fully automatic Anderson equipment. Use Model 34-F for any size or make of nesting round cup up to and including pints . . . Model 34F-20 for sizes up to 32 ounces.
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Anderson equipment is preferred for simple operation and dependable performance — proved by actual daily use in dairy and food plants.
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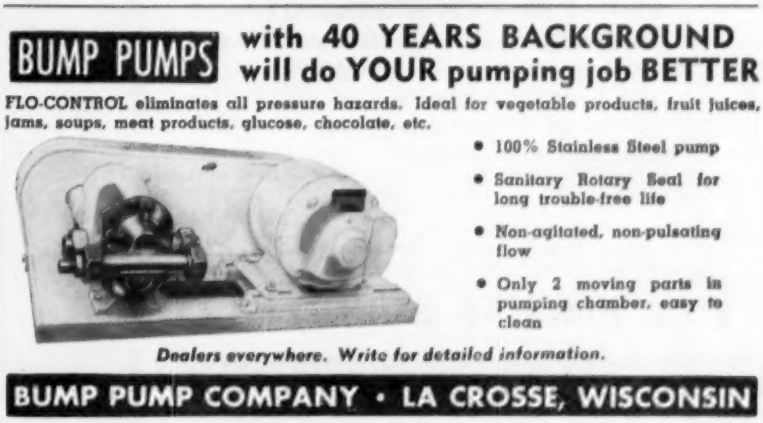
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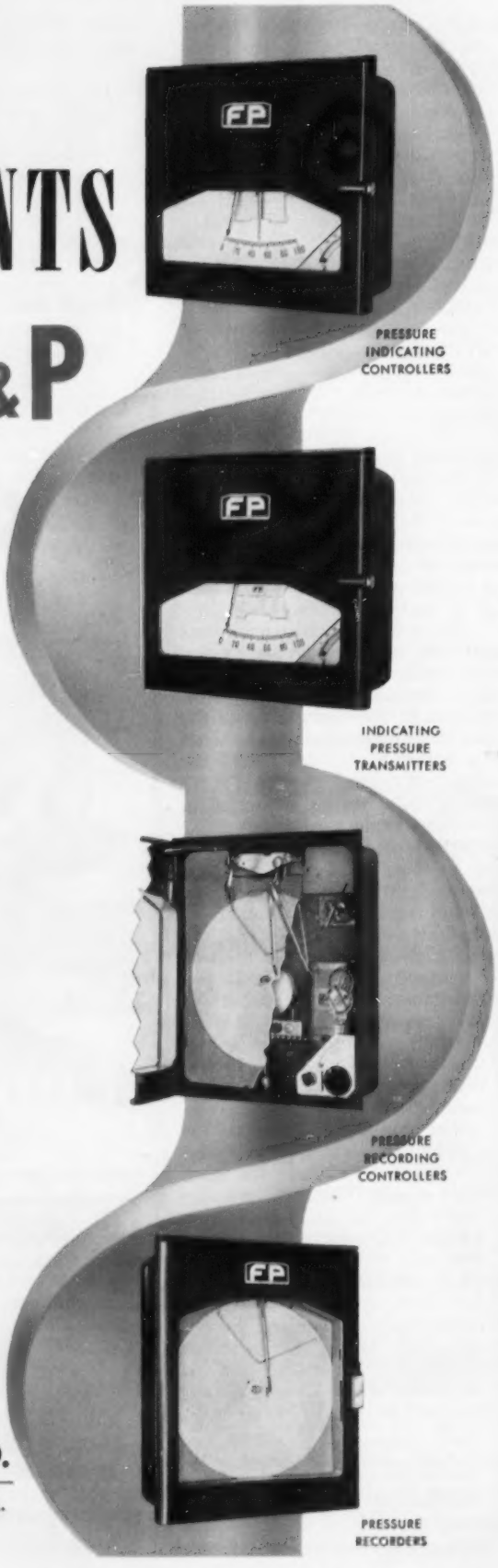

Fischer & Porter now proudly offers a complete line of pressure instruments for one week shipment from stock. These accurate pressure instruments may be used to measure vacuum pressure or gauge pressure from absolute zero to 1,000 psig.

The pressure elements are available in brass, 316 stainless steel, phosphor bronze and berryllium copper. Guaranteed accuracy of all instruments is 1% of full scale, with positive over-range and under-range protection built into each instrument. Recorders, recording controllers, indicators, indicating controllers and pneumatic transmitters are available for one week shipment.

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Fischer & Porter is in the instrument business to assist you. Doing it expertly and well has helped F&P grow. Get to know F&P better, call on F&P for a single instrument or a complete process instrumentation system.

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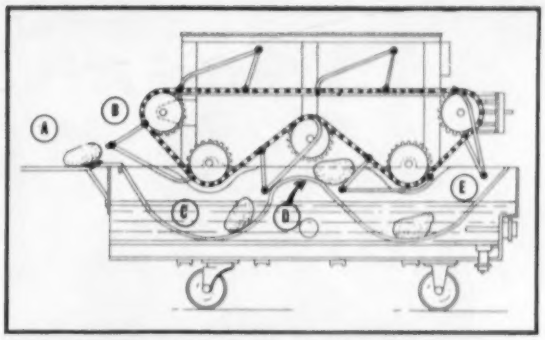
Recent Inventions



Continuous Unit Ice-Glazes Meat Surface

Product enters continuous glazer on conveyor (A). It is engaged by extension (B) of overhead conveyor and moves along meat-supporting surface (C). Latter consists of two end sections below water level and an intermediate length kept in a freezing atmosphere. First glaze forms as wet meat traverses freezing section (D), then a second coat is applied as product exits along end section (E).—*O. Garapolo, Chicago, to Wilson & Co., Inc. No. 2,723,645. Nov. 15, 1955.*

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Shirred Sausage Casing Comprising Compressed Cellulosic Material Having Concave Folds—J. R. Blizzard and J. W. Firth, Chicago, and L. M. Wynkoop, Lyons, Ill., to Tee-Pak, Inc. No. 2,723,201. Nov. 8, 1955.

Sour Cream by Pasteurizing Cream of 7-12% Fat, 2.6-2.9% Protein, Homogenizing, Adding Lactic Acid Starter, Ripening to Whey Acidity of 0.7-0.9%, Heating to 165 F., Separating Curd, Recombining With Whey to Raise Protein Content of Mixture to Above 3%, Mixing, Heating to 145 F., Homogenizing—R. A. Page, Evanston, and V. G. Lavalie, Chicago, to Kraft Foods Co., Chicago. No. 2,719,793. Oct. 4, 1955.

Quick-Cooking Rice by Heating Partially Hydrated Grains to Gelatinizing Temperature in Absence of Excess Water—C. E. Flynn, E. Patterson, and F. Hollis, Jr., Weehawken, N. J., to General Foods Corp., New York City. No. 2,720,460. Oct. 11, 1955.

EQUIPMENT

Container Decapping Tool Comprising Tubular Member, Expandable Chuck, Cam, Hook, Resilient Means—W. A. Finley, Oaklyn, N. J., to Supplee-Wills-Jones Milk Co., Philadelphia. No. 2,718,801. Sept. 27, 1955.

Moveable Meathook Having Track Wheel, Axle, Depending Support, Weight-Responsive Rail-Engaging Means, Vertically Slidable Hook, U-Shaped Member, Coil Spring—T. D. Cacciatore, Tampa, Fla. No. 2,718,852. Sept. 27, 1955.

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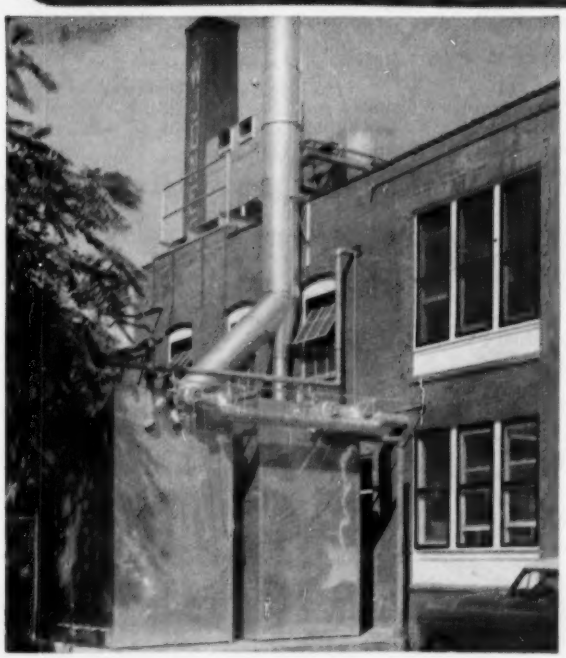
The "King Zeero" provides Ice Water (32°-34°) in Large Quantities at Low Cost



Tons of ice are frozen on the extra heavy coils during the "off-peak" periods, ready for your disposal without handling when needed for quick cooling of food products.

The "King Zeero" is a combination ice accumulator and continuous water cooler. With our new HI-LOAD or extra HI-LOAD Coils on vertical models, additional flash cooling capacity and faster ice making rates are obtained.

"King Zeero's" Patented Built-In Agitation obviates the necessity of a mechanical agitator. No moving parts to require servicing and expense.

Only a relatively small compressor is needed. With the "King Zeero" you have LOWER POWER DEMAND CHARGE — LOWER MAINTENANCE — LOWER OPERATING COSTS — LESS INVESTED CAPITAL.

A size for every operation — large or small — capacities 500 to 36,000 lbs. in a single unit. Write for full information.

"King Zeero" Model 2-E-612W installed outside of Jones Dairy, Buffalo, N. Y.

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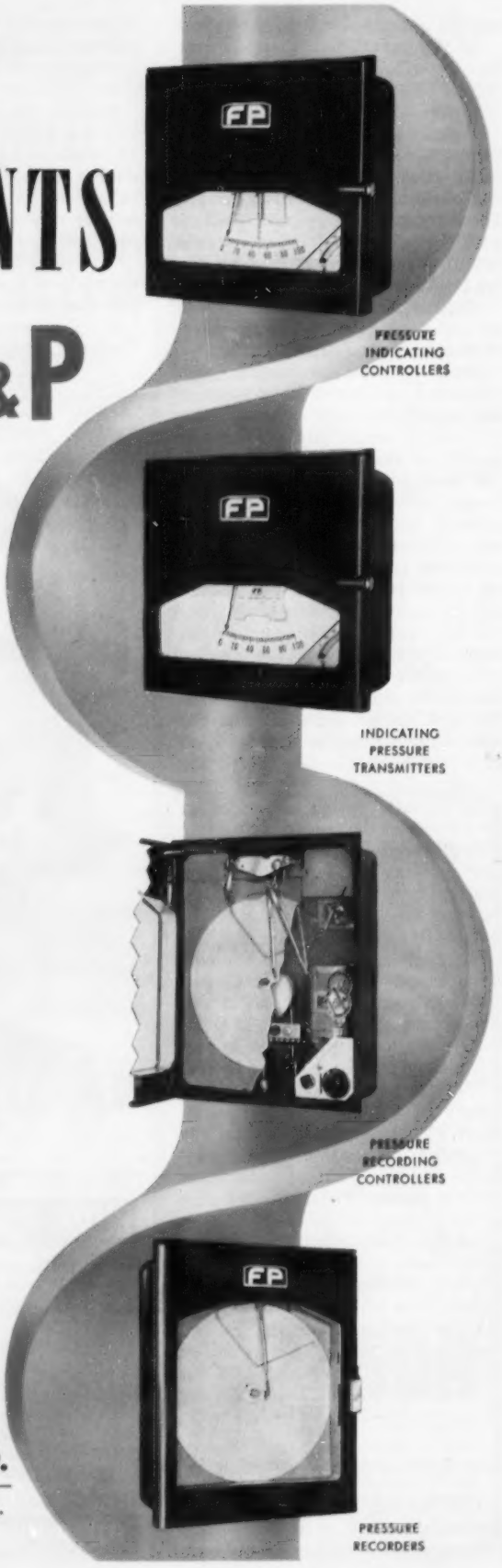

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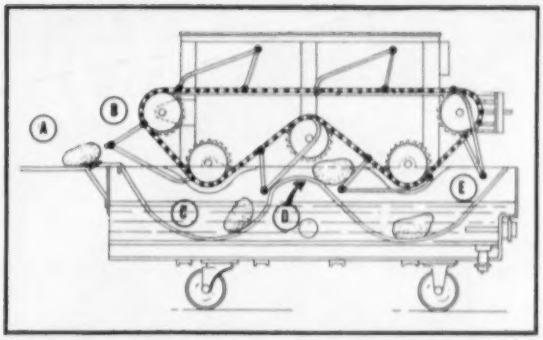

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Missouri Division of Resources and Development, Dept. A694
Phone—Jefferson City 6-7185
Jefferson City, Missouri

Jose, Calif. No. 2,718,867. Sept. 27, 1955.

Grain Cleaner and Separator Including Blower, Wind Tunnel, Screen, Normally Vertical Rotatable Baffle—H. T. Potter to D. R. Potter, Leonardsburg, Ohio. No. 2,718,967. Sept. 27, 1955.

Centrifugal Separator Bowl Having Nozzles for Continuous Solids Discharge—G. J. Strezynski, Poughkeepsie, N. Y., to De Laval Separator Co., New York City. No. 2,719,003. Sept. 27, 1955.

Vegetable Mixer and Breaker Comprising Hoppers, Continuous Metering and Feed Means, Agitator, Breaker Including Casing With Stationary Fingers, Rotatable Roll Having Interspaced Fingers, Pivotally Mounted Grate, Bell-Crank Lever, Handle, Slotted Bottom Plate—A. S. Pearson, Exmore, Va., to John H. Dulany & Son, Fruitland, Md. No. 2,719,030. Sept. 27, 1955.

Want more information on any of these recent patents—if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Olive-Processing Tank Having Lengthwise Central Top Opening, Smooth-Surfaced Interior, Air Conduit, Longitudinally Spaced Air Inlets, Valve—W. H. Kagley, H. H. Wylie, and R. Webster, to Lindsay Ripe Olive Co., Lindsay, Calif. No. 2,719,477. Oct. 4, 1955.

Continuous Sterilizer for Canned Foods Consisting of Housing Having Tortuous Passage, Pressurized Steam Chamber, U-Shaped Liquid Seals, Endless Conveyor, Container Carriers, Adapted for Rotation, Loading, Unloading Means—J. B. van der Winden, Amstelveen, to Gebr. Stork & Co.'s Apparatenfabriek N. V., Amsterdam, Netherlands. No. 2,719,478. Oct. 4, 1955.

Pie Filling Machine With Shell Conveyor, Overhead Reservoir, Depending Spouts, Valves, Means for Manually Actuating Valves Simultaneously—W. A. Arnieri to T. Tonna, Worcester, Mass. No. 2,719,496. Oct. 4, 1955.

Fruit Stemmer Employing First Pair of Parallel, Oppositely Directed Rollers With Resilient Soft Friction Surfaces, Drive Means, Second Pair With Hard Smooth Surfaces Spaced Between First Pair by Springs—B. T. Wood to Lindsay Ripe Olive Co., Lindsay, Calif. No. 2,719,555. Oct. 4, 1955.

Olive Bottler Including Horizontal Rotating Drum With Peripheral and Annular Side End Walls, Lifting Blades, Bottle Conveyor, Fruit Supply Chute—B. C. Eisenberg, Brooklyn, N. Y. No. 2,719,661. Oct. 4, 1955.

Fruit, Vegetable Cleaner Consisting of Frame, Horizontal Conveyor, Parallel Rotary Brushes—M. Salkin, Berkeley, Calif., to California Packing Corp., San Francisco. No 2,719,993. Oct. 11, 1955.

Fish-Dressing Tool Employing Opposed Pincers, Integrally Attached Knife Edge, Tension Spring, Brackets—E. S. Hobson, Cleveland, Minn. No. 2,720,001. Oct. 11, 1955.

Juice Machine Having Crushing Chamber, Access Aperture, Jaws, Power Means, Washing Manifold—W. F. Kammer, Wenatchee, Wash. No. 2,720,161. Oct. 11, 1955.

Slicer for Semi-Soft Material Comprising Feed Hopper, Conveyor, Cutting Member, Synchronizing Means—A. E. Hoag, Jersey City, to June Dairy Products Co., New York City. No. 2,720,233. Oct. 11, 1955.

Gravity-Feed Chute for Containers Including Inlet, Intermediate, Outlet Sections, Pivotally Connected Knee Joints, Bars—H. W. Madden, Hanover, Ind. No. 2,720,302. Oct. 11, 1955.

Smoke-Arresting Unit With Conveying Duct, V-Shaped Water Tank, Deflector Partition, Spray Nozzles, Induction Assembly—G. Bungas, Pittsburgh. Nos. 2,720,385-386. Oct. 11, 1955.

Splitting Peg for Separating Membranes of Animal Intestines Employing Equally Spaced Cutters, Centering Member, Curved Guides—O. H. Valentine, and J. J. Goralczyk, Chicago, and R. W. Bergman, Joliet, Ill., to Ethicon, Inc. No. 2,720,678. Oct. 18, 1955.

Apparatus for Cutting Test Specimen of Potato for Moisture Determination—L. S. Hel-

ler, Boise, Ida. No. 2,720,901. Oct. 18, 1955.

Flavor-Volatiles Recovery Unit Comprising Condenser, Bottom Warming Chamber, Flavor and Gaseous-Nitrogen Ports, Refrigerant Jacket, Vibrator—E. R. Beu, Churchville, N. Y. No. 2,720,936. Oct. 18, 1955.

Conveyor-Chain Lubricator Consisting of Tank, Vertical Baffle Defining Float and Soap-Solution Basins, Float Valve, Contact Wheels Having Peripheral Absorbent Material—E. C. Carson, to Knudsen Creamery Co. of California, Los Angeles. No. 2,720,941. Oct. 18, 1955.

PROCESSES

Preserving Partially-Used Oxidizable Material in Sealable Container by Incorporating Oxygen-Absorbing Substance in Headspace—J. M. Ellis, Lafayette, Calif. No. 2,719,660. Oct. 4, 1955.

Conditioning Starch for Enzymic Conversion by Mixing Aqueous Starch Slurry With Monocalcium Phosphate, Filtering, Drying—W. R. Fetzer and R. M. Hamilton to Clinton Foods, Inc., Clinton, Iowa. No. 2,720,465. Oct. 11, 1955.

Extracting Sodium Vanillinate From Aqueous Liquor by Mixing With Aqueous Propanol, Separating Phases, Recovering—C. C. Bryan, Seattle, to Monsanto Chemical Co., St. Louis. No. 2,721,221. Oct. 18, 1955.

Blending Immiscible Fatty Triglycerides by Mixing in Presence of Rice Oil—W. W. Ginn to Vejin, Inc., Cincinnati. No. 2,721,803. Oct. 25, 1955.

Stabilizing Fatty Material by Adding NDGA Plus 2,4,6-Trialkylphenol—R. H. Rosenwald, Western Springs, to Universal Oil Products Co., Des Plaines, Ill. No. 2,721,804. Oct. 25, 1955.

Refining Low-Grade Fats by Washing With Aqueous Caustic Alkali, Distilling—N. Mattikow and D. Perlman, New York City, to B. Clayton. No. 2,721,872. Oct. 25, 1955.

Producing Condiment by Extracting Incompletely Burned Vegetable Matter by High-Voltage Precipitation, Collecting on Cold Surface Covered With Deflavored Oil, Mixing With Usual Sauce Ingredients—A. W. Betts, West New York, to Smoked Foods Research Institute, Inc., Palisades Park, N. J. No. 2,722,482. Nov. 1, 1955.

PACKAGING

Heat Sealer for Thermoplastic Sheets Employing Cooperating Pressure Members, Heating Element, Thermostatic Controls—E. B. Gardner, Williston Park, N. Y., Emhart Mfg. Co. No. 2,719,567. Oct. 4.

Fiber Drum Consisting of Tubular Body of Convolutely Wound Laminated Layers, Bottom Closure, Upper Metal Binding Strip, Severable Sheath—R. D. Minteer, Webster Groves, and L. B. Leighton, Clayton, Mo., to Greif Bros. Cooperage Corp., Delaware, Ohio. No. 2,719,662. Oct. 4.

Carton Former Having Conveyor, Devices for Distending and Setting Up Carton Side Walls, Rotating Folding Mechanism.—W. H. Inman to Bloomer Bros. Co., Newark, N. Y. No. 2,720,143. Oct. 11.

Vacuum-Filling of Fine Powders by Passing Product Through Successive Evacuated Zones, Weighing, Transferring to Container by Pressure Differential—C. F. Carter, Danville, Ill. No. 2,720,375. Oct. 11, 1955.

Solids-Packing Machine Comprising Frame-Mounted Hopper, Pivoted Weighing Beam and Frame, Container Support, Nozzle, Screw Conveyor, Synchronizing Means—E. A. Kerler to E. D. Coddington Mfg. Co., Milwaukee. No. 2,720,377. Oct. 11, 1955.

Automatic Carton Feeder Consisting of Blank Magazine, Alternately Operable Parallel Pushers, Oscillatory Shaft, Arms—J. L. Ferguson to J. L. Ferguson Co., Joliet, Ill. No. 2,720,394. Oct. 11, 1955.

Bag Opener Comprising Multi-Sided Pyramidal Member With Upstanding Point, Radial Fins Having Oblique Cutting Edges—P. A. Coffman, Jr., Cranston, R. I., to B-I-F Industries. No. 2,720,698. Oct. 18, 1955.

Label Feeder Employing Movable Finger, Guide Plate, Roller, Synchronizing Means—B. A. Arvidson, Villa Park, Ill., to Miller Wrapping & Sealing Machine Co., Chicago. No. 2,720,994. Oct. 18, 1955.

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Antibiotic Introduced As Spoilage Inhibitor For Fresh Poultry

—Continued from page 48

by human hands." It will be of good bloom and without odors—even if her bird is frozen and she forgets to open the package during the defrosting process. She need not have a bird which may have been unwrapped, washed, and rewrapped.

Uniform freshness, though, is what the technical work to date indicates as possible. As in so many other commodities, this is an elusive, sought-after quality. It depends largely on keeping bacterial life at a minimum.

Costs ⅓ to ½ Cent a Pound

Acronize, as recommended for use in quality control section of the franchise agreement, costs the processor between one-third and one-half cent a pound of poultry. Because of the simplicity of the method, added equipment costs are not appreciable. Some metering devices for a concentrated master solution are desirable for the larger plants.

Background of Research

While poultry is the first commodity for which chlortetracycline has been cleared for commercial use, research on other flesh foods has been in progress longer.

The story begins in 1944 in the laboratories of the Canadian Pacific Fisheries Experimental Station, Vancouver, B. C. There Dr. Hugh Tarr and associates reported[10] on the effectiveness of compounds related to penicillin in preserving flesh foods. Experiments continued as other antibiotics became available.

In October, 1955, Dr. Tarr made this report[14] to the International Conference for the Use of Antibiotics in Agriculture: "Since extensive work showed that, of the tetracycline group, chlortetracycline was always the most active, all our recent work has been conducted with this antibiotic."

Meanwhile, as scientists in several countries became interested in the development of antibiotics for food preservation, attention turned to the work of Dr. Fred Deatherage and associates at Ohio State University. Working on red meats, Dr. Deatherage also concluded that Aureomycin chlortetracycline was the antibiotic of choice. These findings were published in 1953.[18]

In June, 1954, Kohler, Miller, and Broquist,[33] of American Cyanamid Co., reported on the effectiveness of various antibiotics in maintaining the freshness of poultry. They, too, reported that Aureomycin chlortetracycline appeared to be the most effective. Stadelman and his associates have also reported[16] on the effectiveness of Aureomycin chlortetracycline to increase the shelf-life of poultry.

Aureomycin chlortetracycline proved a definite deterrent to bacterial growth in poultry. Processed birds, thus treated, were held three weeks in packages under commercial storage conditions and then eaten by 45 families in Pearl River, N. Y. Significantly, no one could tell them from fresh-killed birds.

Data in all these research papers showed the contrast in bacterial counts between the control and unprocessed fish, beef, or poultry and that which had been processed with Aureomycin chlortetracycline. The contrast was the greater the longer the time from killing. It was clear that Aureomycin chlortetracycline did indeed help to maintain "freshness." It did not bring any adverse changes in color, odor, or taste of the processed commodities. And by retarding the bacterial growth, it helped to maintain those qualities associated with freshness.

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End (Resume reading on page 49)

Men & Companies

Arnold L. van Ameringen, (left) former president, has been elected to the newly-created post of chairman of the board of van Ameringen-Haebler, Inc., while **Charles Walker, Jr.** has been upped to president and chief executive officer.

Industry

A. D. Adler Ltd., London confectioner, is erecting a modern one-story plant in Bay Roberts, Nfld.

Borden Co. has announced that it has acquired the capital stock of **American Resinous Chemicals Corp.,** Peabody, Mass., and **Reslac Chemicals, Inc.,** Chicago.

B. C. Sugar Refining Co., Ltd., Vancouver, will begin construction of 36,000 sq. ft. warehouse and unloading dock as part of its $1.5 million modernization program.

California Packing Corp., San Francisco, plans to open its new can manufacturing plant in Toppenish, Wash., this summer.

Chemical Salt Production Co. has been formed in Great Salt Lake, Utah as jointly-owned subsidiary of **Hooker Electrochemical Co.,** Niagara Falls, and **Penna. Salt Mfg. Co.,** Philadelphia.

Coca-Cola Co. has announced income for first 9 months of '55 equalled $5.39 per common share, 8.4% above '54.

Consolidated Foods Corp. has acquired **Omaha Cold Storage Co.** through exchange of stock.

Continental Baking Co. has completed its acquisition of business and properties of **Morton Packing Co.,** Louisville, Ky.

Duffy-Mott Co. has closed plants in Voorheesville and Ravena, N. Y. temporarily.

Ferguson-Langfield Frozen Foods Inc. is constructing a $180,000 freezer storage distribution base in San Leandro, Calif.

Foremost Dairies, Inc. has exercised its option to acquire **Western Condensing Co.,** Petaluma, Calif. through exchange of 1.2 shares of Foremost for each Western share.

Garden City Co., only sugar processor in Kansas, has sold its properties to **Holly Sugar Corp.,** Colorado Springs.

General Foods' Maxwell House Div. will construct an addition to its Hoboken, N. J. plant.

Gioia Macaroni Co., Inc. is building an addition to its Buffalo, N. Y. plant.

W. Grant Horsey is president of newly-formed Shirriff-Horsey Corp., Ltd., an international food processing firm with plants in three countries. Company is the result of a merger of Shirriff's Ltd. of Toronto and J. William Horsey Corp., Plant City, Fla.

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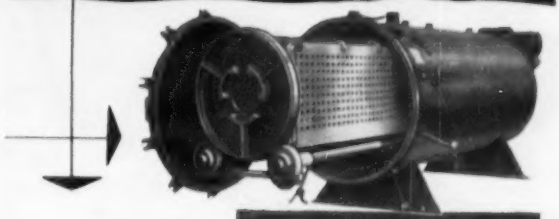

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In operation, the cans are placed in the revolving cage so that they will agitate end-over-end continuously during the cooking period. Cans are first pressure-cooled after cooking, then cooled to atmospheric pressure, all in the sterilizer. The cage revolves slowly at a rate of 16 r.p.m., but the speed of cage may be as low as 5 r.p.m.

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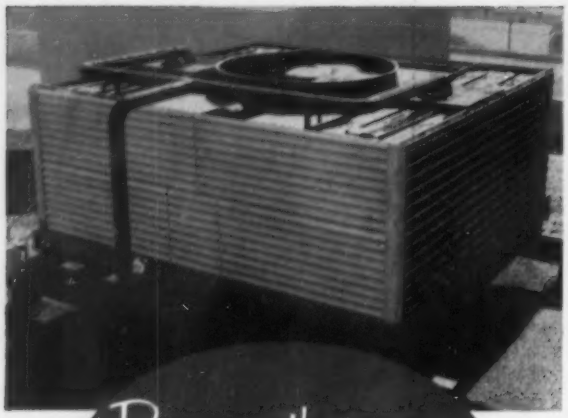

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MARLEY **The Marley Company**

Kansas City, Missouri

Dr. Maurice Kinsey has been named vice-president in charge of plant operations for Tee-Pak, Inc., Chicago.

Goebel Brewing Co. has suspended operations at its Oakland, Calif., brewery.

Lady's Choice Foods has acquired the **Rudolph Stenzel Pickle Co.** in San Leandro, Calif.

Mary Sue Candies, Inc., Baltimore, Md., is erecting a one-story plant.

Minute Maid Corp. has announced that sales of its fiscal year (ending Oct. 31) totaled over $100 million.

Mogen David Wine Corp. has purchased new plant facilities, increasing its capacity over 300%.

National Starch Prod. Inc. has opened a new plant for manufacture of solvent adhesives at Plainfield, N. J.

Neumann-Buslee & Wolfe, Inc., essential oil producer, has expanded, doubling its facilities.

Pepsi-Cola Co. has begun construction of a $2 million plant in Montreal.

Peter Fox Brewing Co. plans to move brewing operations from Chicago to Waukesha, Wis. some time this month.

Riverside-Highgrove Citrus Assn. and **Monte Vista Citrus Assn.**, major Sunkist packing houses, have announced their intention to merge.

Southern Dairies has acquired stock of four new firms: **Cloverland Dairy Products Corp.**, New Orleans, **Brookhaven Creamery Co., Inc.**, Brookhaven, Miss., **Magnolia Creamery Co., Inc.**, Magnolia, Miss., and **White Ice Cream & Milk Co.**, Wilmington, N. C.

Standard Brands Inc. will buy assets of **Clinton Foods'** corn processing div., Clinton, Iowa.

Stokely-Van Camp, Inc., has increased its holding of capital stock of **Capital City Products Co.**, and now owns 40.81% of outstanding shares.

Totem Pole, Inc., Royal Oak, Mich., has been incorporated for $50,000 by Mildred Hund to process all types of food.

United Fruit Co. opened a new office in Houston, Texas the first of the year.

Personnel

John R. Beckett and **Marco F. Hellman** have been elected directors of S&W Fine Foods Inc., San Francisco, while **Carl F. Roberts** was elected vice president.

Holton Diamond has been appointed research director of Rich Products Corp., Buffalo.

Dr. Albert Elder, director of Corn Products Refining Co., has been elected chairman of American Chemical Society's Div. of Agricultural & Food Chemistry.

Clarence Francis of General Foods Corp. has received the Annual Public Service Award given by the Advertising Council.

Margaret Gibson is new director of experimental kitchen of Henningsen, Inc., Springfield, Mo.

Fred Hoover, Jr. has been appointed executive vice-president of Albers Milling Co., subsidiary of Carnation Co., Los Angeles.

Edward Lewis has been elected president of Coca-Cola Bottling Co., N. Y. C., succeeding **James Murray** who has moved up to chairman of the board, a new post.

Harlan Logan has been named v.-p. for personnel and public relations for General Foods Corp.

Philip Rizzuto is new president of Southland Frozen Foods, Inc.

Julius Ross, former president, has been elected chairman and chief executive officer of River Brand Rice Mills, Inc., New York.

Homer Sheridan has been named a director of Consolidated Foods Corp., Chicago.

Grover Steffen has been elected president of recently-organized Vinegar Institute.

K. F. Wadsworth has been elected board chairman of Maple Leaf Milling Co., Ltd. and **C. E. Soward** named president.

Roy Wooster, v.-p. of Borden Co., has been named a director of the firm.

Associated Industries

American Can Co. has completed a $2 million addition to its San Francisco plant.

American Viscose Corp., Philadelphia, has opened the first West Coast warehouse for storage and handling of cellophane.

Arwell, Inc. has appointed James Blankmeyer staff sanitation consultant.

F. M. Ball & Co., Oakland, Calif., has elected Dr. Albert D. Schwaner president.

Bemis Bro. Bag Co. has begun operation of its paper specialty dept.

Borg-Warner Corp. has announced an agreement to acquire **Primor Products, Inc.**, Adrian, Mich.

Continental Can Co. has elected Thomas Fogarty president effective Jan. 1.

Cornell Paperboard Products Co. has acquired **Carton Craftsmen, Inc.**, Chicago.

Conoflow Corp., Philadelphia, has announced a stock-exchange agreement with **Walworth Co.** making it an operating subsidiary of Walworth.

Dairypak Inc. has announced plans for a $1 million plant and office building in Olmsted Falls, Ohio.

Dow Corning Corp. has elected William Decker to its board.

Felton Chemical Co., Inc. Brooklyn, is now producing true fruit flavor extracts.

Fuller Co. has completed its new engineering building in Catasuqua, Penna.

Elenora Chemical Corp. has elected Hans Wyman president.

Hudson Pulp & Paper Corp., New York, will begin producing cups and containers this year, and is considering constructing a $25 million newsprint mill at Palatka, Fla.

William A. Kilby has been appointed president and general manager of Good Foods, Inc., Culver City, Calif. producer of cellophane and vacuum packed food specialties.

Koppers Co., Inc. Pittsburgh, Penna. has purchased 80% of **Durethene Corp.'s** common stock.

Minnesota & Ontario Paper Co. has named Robert Faegre president and chief executive officer.

Pacific Fruit Express Co. has announced plans to build 1,800 standard refrigerator cars and 200 extra-large mechanically cooled units at estimated cost of $26 million.

Raymond Bag Co., Middletown, Ohio, is now operating as a wholly owned subsidiary of **Albemarle Paper Mfg. Co.**, Richmond, Va.

St. Regis Paper Co. announces it is acquiring 100% capital stock of **Gummed Products Co.**, Troy, Ohio, and **Ajax Box Co.** of Chicago, Ill.

Southwest Research Institute has added Dr. Brell Beadle to its staff as manager of biochemistry research.

White Cap Co., Chicago, Ill., has been acquired by **Continental Can Co.** and will be operated as a subsidiary.

Deaths

Stanley Imanski, president of Bodger Sausage Co.—Nov. 4.

P. Val. Kolb, president of Sterwin Chemicals, Inc., New York.—Dec. 5.

Walter Wachowitz, Sr., president of Alloy Products Corp., Waukesha, Wis.—Nov. 7.

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for service, too

Lunch Served From 11 A.M. to 2 P.M.; Dinner 5 to 8 P.M.
CLINTON HOUSE
Menu
FOR TODAY
LUNCHEON SUGGESTIONS
BIG SLICE OF SOUTHERN BAKED HAM* . . . garnished with pineapple* rings . . . whipped potatoes & gravy* . . . whole-grain corn* . . . fresh roll* & butter . . . coffee or tea
THICK CORNED BEEF* SANDWICH . . . choice of fruit cocktail*, salad* or cream of mushroom soup* . . . cherry pie* . . . coffee or tea
TWO FRESH EGGS AND BACON* STRIPS . . . toast* & jelly* . . . steaming coffee or tea
ASSORTED COLD CUTS* . . . french fries* . . . sweet pickle* slices . . . bread* & butter . . . coffee or tea
A LA CARTE
Cream-Style Corn* String Beans* Creamed Peas*
SALADS
Diced Fruits*
Tomato Slices on Lettuce
Fruit Gelatin*
Cottage Cheese on Peach*
DESSERTS
Choice of Fresh Pies*
Ice Cream*
Choice of Pudding*
Assorted Candies*
BEVERAGES
Coffee — Tea — Milk — Bottled Beer*

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CORN SYRUP
REFINED CORN OIL

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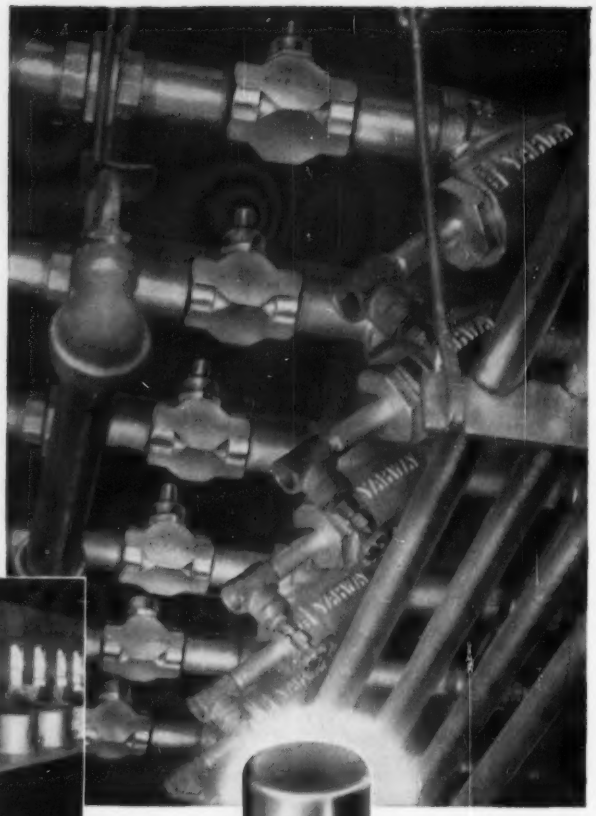
Ocean Spray cooks up more cranberry sauce profits with *Yarway Impulse Traps*



"Ocean Spray", a famous name in cranberry sauce and jelly, is now using *Yarway Impulse*, a famous name in steam traps, on jacketed cooking kettles at their Bordentown, N. J. plant.

Result—greater cooking efficiency, less down-time, and a bigger batch of profits.

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PLANT ENGINEERING

Low-Cost Tube Fittings

Considers advantages of using nylon tube fittings for joining stainless steel, nylon, aluminum, and copper tubing. Items are said to cost 90% less than other fasteners. Bulletin 3049, 4p.—Imperial Brass Mfg. Co., Chicago. (199A)

High Vacuum Pumps

Details operation, advantages, and engineering facts for a line of rotary vacuum pumps, available in sizes from ½ hp. (2-cu.ft.-per-min.) to 40 hp. (780-cu.ft.-per-min.). Catalog 425, 51p.—New York Air Brake Co., Kinney Mfg. Div., Boston. (199B)

Barometric Condensers

Diagrams illustrate a group of disk-flow and ejector-jet barometric steam condensers. Features of each type are discussed. Form 9012-A, 8p.—Ingersoll-Rand Co., New York City. (199C)

Roller Chain, Sprocket Line

Comprehensive catalog gives full information for selection and use of a wide line of roller chains and sprocket combinations. Numerous pictures show equipment and application. Catalog 754, 65p.—Diamond Chain Co., Inc., Indianapolis. (199D)

Packaged Boiler Plant

Provides information on packaged boilers ranging from 12 hp. to 125 hp. Operating characteristics of gas, oil, and gas-oil burners are discussed. Applications are noted. Bulletin A-1041, 8p.—Eclipse Fuel Engineering Co., Rockford, Ill. (199E)

Air-cooled Condensers

Considers low cost and efficient operation of an air-cooled condenser line for use with air conditioning systems where cooling water is scarce. Performance data is tabled. Bulletin AC-100, 4p.—Halsted & Mitchell, Pittsburgh. (199F)

Industrial Water Softener

Drawing illustrates features, table lists specifications of a resin-type water softener. Units available in 150,000- to 1,500,000-gr. exchange capacities. Bulletin MSP-123, 4p.—Hagan Corp., Pittsburgh. (199G)

Panel Insulation

Concerns construction details of an insulation panel comprising a polyester-resin-impregnated, glass-fiber cloth bonded to different thicknesses of a specially treated polystyrene core. Material is said to be strong enough for use as a structural component. 8p.—Haskelite Mfg. Corp., Grand Rapids, Mich. (199H)

Emergency Lighting

Automatic battery charging is main feature of a line of emergency lights. They are also dust, vapor and waterproof. Catalog 10, 8p.—Electric Cord Co., New York City. (199I)

Bucket Steam Trap

Shows inverted bucket design and valve mechanism said to be particularly efficient in retaining priming condensate. Bulletin includes capacity selection tables. Bulletin 360-A, 4p.—Sarco Co., Inc., New York City. (199J)

Plastic Exhaust System

Gives all facts—and pictures component parts—of a corrosion-free plastic duct system. 8p.—American Agile Corp., Bedford, Ohio. (199K)

Spray-Coil Dehumidifier

Discusses application data, selection, and use of a spray-coil dehumidifier. Design and construction features of these air conditioning units are emphasized. Bulletin 7827-H, 20p.—American Blower Corp., Detroit. (199L)

Disk-Diaphragm Valves

Shows operating features and construction of a valve that combines advantages of a positive closing disk with a diaphragm for positive seal. Dimensions and price list included. Bulletin F1-154, 4p.—Ferris Flexible Valve Corp., Palisades Park, N. J. (199M)

Regulators, Governors

Concerns advantages of float-and-lever valves, pump governors, and pressure regulators. Condensed bulletin presents features with cutaway drawings. Folio 4, 4p.—Schade Valve Mfg. Co., Philadelphia. (199N)

Bronze Meter Line

Concerns a 2-, 3-, and 4-in. line of bulk-type liquid meters, ranging in capacity from 20-500 gpm. Accessories include remote registration systems for one-man control, a variety of registers, strainers, and air eliminators. Bulletin OG 409, 8p.—Rockwell Mfg. Co., Pittsburgh. (199O)

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Centralized Lubrication

Fully illustrated bulletin depicts a central lubrication system. Diagrams show action. Fittings and accessory parts are listed. Bulletin 26-R, 20p.—Farval Corp., Cleveland. (200A)

Hydraulic Couplings

Considers strength and efficiency of a threaded, snap-type coupling. Units are designed to handle hydraulic or air pressures up to 10,000 psi. in the ¼ in. size. Bulletin 240, 4p.—Snap-Tite Inc., Union City, Pa. (200B)

Plastic Pipe Fittings

Booklet contains facts on series of plastic threaded- and socket-type fittings and flanges. Includes installation information, pressure-temperature charts, and chemical resistance tables. 12p.—Tube Turns Plastics, Inc., Louisville, Ky. (200C)

Float-Type Traps

Covers full facts on a line of semi-steel and fabricated-steel float traps for steam pressures from 250-1,000 psi. Bulletin 410, 4p.—Clark Mfg. Co., Cleveland. (200D)

Custom-made Water Tanks

Tells features of custom-fabricated, hot water service, storage, and pneumatic tanks. Various corrosion-resistant linings are discussed. 4p.—Stover Steel Tank & Mfg. Co., Freeport, Ill. (200 E)

Compressed Air Filters

Construction, operation, and action of a series of compressed air line filters are detailed. Unit features disposable filter cartridge. Bulletin M-7155, 4p.—Hankison Corp., Pittsburgh. (200F)

Bag-type Collectors

Refers to advantages of a line of self-contained, cabinet-type dust collectors. Units stop dust by means of filter cloth bags, that install easily on equipment. Units are available in portable models. Bulletin 70-G1, 4p.—Omega Machine Co., Providence, R. I. (200G)

Wide Valve Line

Bulletin gives condensed information on a series of gage, globe, check, "Y," and needle valves. All models are built for corrosion-resistant service. Form 146, 4p.—William Powell Co., Cincinnati. (200H)

Hard-Rubber Pipe

Three bulletins give data on pipe and fittings, tank linings and covers, and pumps, constructed of rubber or rubber-plastic combinations. Many photos and diagrams illustrate specifications and applications. Bulletins CE-51, CE-55, and CE-53, 36p. total.—American Hard Rubber Co., New York City. (200I)

Butterfly Valves

Specifies advantages for line of butterfly valves said to feature compact size and sure pipe-closing performance. Bulletin 650-L1B, 4p.—*Builders-Providence, Inc., Providence. (200J)*

Magnetic Separators

Refers to a line of magnetic separation devices such as drums, pulleys, plates, traps, and grates. Photos show applications. Bulletin MD-200, 6p.—*Homer Mfg. Co., Inc., Lima, Ohio. (200K)*

Dust Collector

Concerns installations and action of a centrifugal type wet dust collector for removing processing dust from plant air. Bulletin 551, 12 p.—*Dust Suppression and Engineering Co., Lake Orion, Mich. (200L)*

Pan Washer

Concerns features, capacity and operation of a self-contained tray and pan washer. Unit has automatic time control. 4p.—*Alvey-Ferguson Co., Cincinnati. (200M)*

Bakery Washers

Bulletin lists modern equipment for pan, utensil, and rack-washing machinery used in bakeries. Extensive illustrations show units and their operation. Bulletin B-54, 8p.—*Metalwash Machinery Corp., Elizabeth, N. J. (200N)*

Plastic Pumps

Bulletin details advantages of plastic pump line, featuring eccentric rotor for positive and non-agitating displacement of fluid medium. Unit is useful in corrosive applications. 4p.—*Vanton Pump & Equipment Corp., Hillside, N. J. (200O)*

Piloted Control Valve

Gives facts on pilot-operated control valve recommended for air, water, light oil, and gas uses. Unit converts from pressure reducing and regulating to back pressure control by switch of control lines. Bulletin includes engineering details, capacities, performance and construction features. Bulletin 966, 4 p.—*A. W. Cash Co., Decatur, Ill. (200P)*

Waste Disposers

Informs on use of a rotary grinding device for continuous disposal of trimming wastes. Unit has 5 hp. and features steel-alloy rotor. 2p.—Herlex Mfg. Co., Chicago. (200Q)

Thermal Liquid Heating

Considers use of mineral oil to promote efficiency in thermal liquid heating systems. Diagram shows plant layout, text describes advantages. 4p.—International Boiler Works Co., East Stroudsburg, Pa. (200R)

Motor Price Sheet

New list announces price changes in a motor line. Con-

densed sheet gives facts on wide variety of models. 4p.—Century Electric Co., St. Louis. (200S)

Heating Boilers

Shows line of low-pressure heating boilers in two series: An automatic model for oil-gas or coal firing; and a hand-fired coal unit. Cross-section and dimensional views aid presentation of engineering data. Catalog F-55, 6p.—Erie City Iron Works, Erie, Pa. (201A)

High Pressure Blowoff

Pictures and specifies line of high-pressure blow-off valves, available with weld or flanged ends. Unit gives tight shut off at pressures up to 2,500 psi. Bulletin B-434, 4p.—Yarnall-Waring Co., Philadelphia. (201B)

Rack Washer

Details construction advances in a cabinet-type washer for bakery racks and delivery cabinets. Unit has self-contained pump, screened solution tanks, and adjustable timing control. 4p.—Alvey-Ferguson Co., Cincinnati. (201C)

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Rubber-Lined Valves

Details line of gate and check valves lined with hard rubber for corrosion resistance. Diagram illustrates construction.—*Dowling Valve & Mfg. Co., Williamsport, Pa. (201D)*

Lightweight Piping

Presents full facts for a line of lightweight, portable aluminum piping and fittings. Bulletin gives applications. 18p.—Aluminum Co. of America, Pittsburgh. (201E)

SANITATION

General Cleaner

Considers features of a general cleaning and wetting agent. Instructions for specific uses are given along with mixing formula. Form 9646, 4 p.—*Oakite Products, Inc., New York City. (201F)*

Pest Control

Handy folder contains informative bulletin on fly control, grain sanitation, safe insecticide use, and a brochure on general pest control.—*Arwell, Inc., Waukegan, Ill. (201G)*

MAINTENANCE

Pump Packing

Considers use of a special material for cup-type packings in hydraulic cylinders. Product is manufactured to a tolerance of .005 in. Table lists standard sizes. Bulletin 5503, 16p.—Darling Valve & Mfg. Co., Williamsport, Pa. (201H)

V-Band Couplings

Illustrates features and applications of a series of V-type connectors for flanged process pipe and tubing. Catalog 40, 44p.—Marman Products Co., Inc., West Los Angeles. (201I)

Portable Hand Pump

Time-saving features stressed in data on portable hand pump used to transfer oil or other fluids from cans. Bulletin 44, 1p.—Trico Fuse Mfg. Co., Milwaukee. (201J)

Stainless Fasteners

Comprehensive tabbed manual lists selection data for wide line of stainless fastening devices such as bolts, screws, pins, rivets, studs, and washers. 52p.—Allmetal Screw Products Co., Inc., Garden City, N. Y. (201K)

Steam Cleaner

Covers use of a self-contained, portable steam-jet cleaning device for in-plant sanitation. Bulletin JC-100, 6p.—Pantex Mfg. Corp., Pawtucket, R. I. (201L)

Band Clamps

Treats of a wide variety of stainless steel and aluminum alloy band clamps used to fasten tubing and metal piping together. Charts and graphs show physical strength, illustration shows application. Catalog 10, 32p.—Marman Products Co., Inc., West Los Angeles. (201M)

Floor Protector

Technical bulletin presents application facts for a new liquid plastic compound that increases resistance of concrete floors to chemical corrosion. 7p.—Garland Co., Cleveland. (201N)

Equipment Mountings

Gives facts on a series of lattice-type rubber machine mounts for reducing heavy machinery vibrations. Capacities from 250 to 3,000 lb. per mounting. Bulletin 701, 4p.—Lord Mfg. Co., Erie, Pa. (201O)

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MATERIALS HANDLING

Under-Body Carrier

Comprises a list of advantages for a straddle-type, under-body load carrier with capacity of 20,000 lb. Table lists models and dimensions. 4p.—*Plug Equipment Co., Benton Harbor, Mich. (202A)*

Reach-And-Carry Lift Truck

Concerns operating facts of a stand-up-type fork truck with extending arms. Heavy-duty model now available with 3,000 lb. load capacity. Bulletin 841, 2p.—*Raymond Corp., Greene, N. Y. (202B)*

Light-Weight Conveyors

Gives all selection facts for a line of light-weight aluminum roller and skate-wheel conveyors. Installation photos show typical layouts. 4p.—*Harry J. Ferguson Co., Jenkintown, Pa. (202C)*

Multi-Door Railroad Car

Treats of unique freight car design, comprising a five-door arrangement, that permits unit loads. Inside partitions are permanent. 4p.—*Unit Load Car Corp., Chicago. (202D)*

Bread Cabinets

Depicts three-model line of wheeled storage and delivery cabinets for bread. Lists advantages and full specifications. 4p.—*Bayles Co., Los Angeles. (202E)*

Floor Trucks, Wheels

Illustrates wide line of materials-handling floor trucks, dollies, and assorted wheel and caster component parts. Catalog 56G, 12p.—*Nutting Truck and Caster Co. Faribault, Minn. (202F)*

Tramrail Features

Concerns design and operation of a tramrail conveying system. Installation photos show application. Booklet 2008-L, 12p.—Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio. (202G)

Magnetic Conveyors

Shows line of space-saving magnetic conveyors. No food industry applications listed, but possible uses seen for handling metal caps and cans. Bulletin MC-250, 8p.—Homer Mfg. Co., Lima, Ohio. (202H)

PROCESSING

Vegetable Cutter

Quick change-over between dicing, stripping, and slicing operations are features listed for a vegetable slicer said to handle up to 4400 lb. per hr. 1p.—*Engineer Design Co., New York City. (202I)*

Batch-Type Extractor

Capacities, construction details, and advantages are discussed for a centrifugal, batch-type unloading extractor. Unit is used to quickly extract wash water from vegetables and other foods. Bulletin TC-5-50, 4p.—*American Machine & Metals, Inc., Tolhurst Centrifugals Div., East Moline, Ill. (202J)*

Prepackaging Bagger

Pictures and details, features and specifications for a twin-bag prepackaging machine that speeds bagging of potatoes, oranges, apples and onions. Unit has capacity of up to 800 sacks per hour, and accommodates containers ranging from 3 to 15 lb. 4p.—*Produce Equipment Co., Inc., Salt Lake City. (202K)*

Bread Freezer

Presents layout for an automatic, conveyorized, continuous freezing system for bread and other foods. Photos and drawings illustrate operation. 4p.—Union Steel Products Co., Albion, Mich. (202L)

Flour Conveyor, Sifter

Pictures and details compact, sanitary machine that sifts and pneumatically delivers flour to dough mixers or storage bins in one operation. Unit uses 4-12 lb. air pressure and only 10 cfm. to move 100 lb. of material per minute. Specification Sheet B-1051, 2p.—J. H. Day Co., Cincinnati. (202M)

Dough Mixers

Concerns dough mixing machine featuring clean design lines and many safety factors. Agitator speeds vary from 38-76 rpm. on small and large size units. 4p.—Triumph Mfg. Co., Cincinnati. (202N)

Cucumber Packing Line

Shows roller grader and brush-type cleaner, distributing belt, and packing bins that form a complete line for waxing and pre-packaging cucumbers and peppers. Bulletin 2528, 4p.—American Machy. Corp., Orlando, Fla. (202O)

Screw Filler

Depicts various ways of using an auger type filler for accurate filling of cans, jars, boxes, and bags, with granules, powders and pastes. Unit handles up to 30-containers-per-min. at 2 g. to 10 lb. fill. Bulletin P-802, 4p.—Stokes & Smith Co., Phila. (202P)

Roll-Forming Machine

Lists specifications for a two-cut or four-cut bakery roll-forming machine that can be equipped with a feeder conveyor. 4p.—F. M. Stewart Co., Philadelphia. (202Q)

Continuous Turbo-Dryers

Considers efficiency of a series of vertical, continuous-transfer-type dryers for small plants, and pilot and experimental operation. Capacities range from 15- to 750-lb.-water-per-hr. Bulletin 2504, 4p.—Wyssmont Co., Inc., Long Island City. (203A)

Proportioning Filler

Considers operating principles of a specially-designed machine for adding small amounts of vitamins, acids, flavors, and other materials to containers, prior to main filling operation. 1p.—Kaufman Laboratories, Louisville, Ky. (203B)

INSTRUMENTS

Electro-Pneumatic Control

Presents an air-electric control device said to combine advantages of pneumatic control with fast response of an electrical system. Data sheet MD46-33 (106), 4p.—*Leeds & Northrup Co., Philadelphia.* (203C)

Liquid Level Measurement

Concerns construction, operation, and features of a liquid level transmitter for measuring closed-tank liquid levels. Simplicity of installation is stressed. Bulletin 13-22, 8p.—Foxboro Co., Foxboro, Mass. (203D)

Rate of Flow Controller

Informs on operation and installation of a power-actuated, rate-of-flow controller. Photos, flow diagrams, tables illustrate features. Bulletin 600-J9A, 2p.—Builders-Providence, Inc., Providence, R. I. (203E)

Pneumatic Regulators

Cutaway drawings show features of this line of pneumatic regulating equipment that includes filter regulator combinations, filters and regulators, relays, and controls. Bulletin H-2, 8p.—Conoflow Corp. Philadelphia. (203F)

Weighing Instrumentation

Describes how semi-continuous scale with dial can operate a counter to provide cumulative indication of pounds of materials weighed. Manual operation feature, depth of stream regulator, and control panel are shown. Technical Reference 55-B, 2p.—Richardson Scale Co., Clifton, N. J. (203G)

QUALITY CONTROL

Precise Tester

Gives details of a new Ionograph that employs filter paper strips for separation and recovery of complex compounds. Instrument will also handle ion mobility and chemical reaction tests. Bulletin 690A, 2p.—*Precision Scientific Co., Chicago.* (203H)

New Canned Foods Manual

Presents second edition of "Processes for Low Acid Canned Foods In Glass Containers". Bulletin 30-L, 45 p.—*National Canners Association, Washington, D. C.* (203I)

Box Testing Methods

Details tests used to test quality and performance in corrugated shipping containers. Provides check list for gaging carton quality. Booklet 11, 22p.—Hinde & Dauch, Sandusky, Ohio. (203J)

Chlorine and pH Control

Comprehensive manual gives detailed facts on testing methods and other factors used to control pH and chlorine content in water supplies. 1955 Edition, 100p.—W. A. Taylor & Co., Baltimore. (203K)

Bakery Standards

New issue of Bakery Sanitation Standards lists quality factors for ingredient water coolers and ice makers. No. 11, 10p.—American Society of Bakery Engineers, Chicago. (203L)

Gas Chromatography

Details elution method of separating gas and liquid samples by chromatographic means. Full particulars given. Booklet 83, 12p.—*Durrell Corp., Pittsburgh.* (203M)

Lab Equipment

New edition of "What's New for the Laboratory" pictures and details wide line of laboratory equipment. Examples range from balances and scales, to a new line of polyethylene containers. Bulletin 24, 22p.—*Scientific Glass Apparatus Co., Inc., Bloomfield, N. J.* (203N)

Microscope Camera

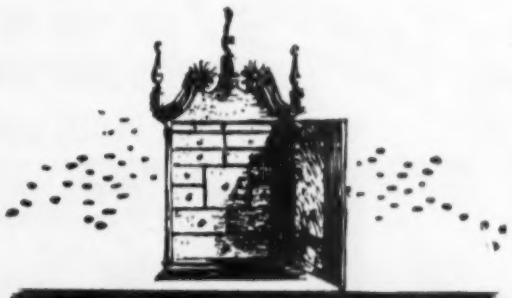
Shows camera and accessories necessary for photomicroscopy work. Details, lenses available and considers methods. Sheet 2-9, 4p.—*Brinkmann Instruments, Inc., Great Neck, L. I.* (203O)

Baking Sanitation Standards

Two booklets give sanitation standards for dividers, rounders, bun machines, bread molders, proofing and fermentation rooms, and coolers. Booklets 8 and 10, total 26p.—*American Society of Bakery Engineers, Chicago.* (203P)

Biochemistry Background

Colorful, illustrative booklet considers history and present developments in the field of biochemical engineering. 32p.—Charles Pfizer, Inc., Brooklyn, N. Y. (203Q)



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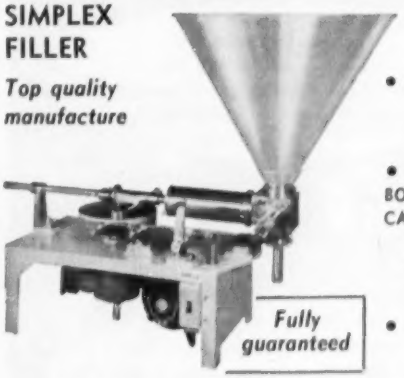

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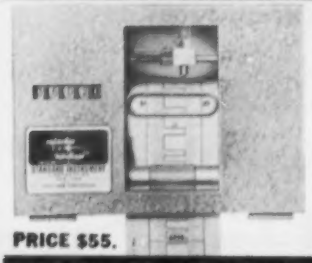

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Conversion Table

Two-colored chart gives conversion table from Fahrenheit to Centigrade degrees from −400 to +4000. Also, shows temperature ranges of various thermocouples, resistance bulbs, and radiation-head sensing elements. 2p.—Thermo Electric Co., Inc., Saddle River Township, N. J. (204A)

MANAGEMENT

Management Seminars

Catalog lists courses and describes functions of a series of fall and winter seminars covering various management problems. 54 p.—*American Management Assn., New York City. (204B)*

Magnetic Bulletin Board

Shows versatile magnetic bulletin board used for graphs, charts, organizational layouts or other displays. Magnetized attachments come in a variety of shapes. 4p.—*Methods Research Corp., Staten Island, N. Y. (204C)*

Safety Materials

Booklet describes and pictures materials available for supervisor and employee safety training. It further lists posters, stickers, and other devices for improving accident-prevention programs.—*National Safety Council, Chicago. (204D)*

Document Protection

Covers microfilming method for protecting valuable documents and records. Outlines space saving and efficiency advantages. Case History 998, 2 p.—*Remington Rand Inc., New York City. (204E)*

Broker's Directory

New book contains listings of more than 1,800 food broker firms located in U. S., Hawaii, Alaska, Canada, Cuba, Mexico. Commodity listings have been expanded to provide more helpful information.—*National Food Brokers Assn., Washington, D. C. (204F)*

Business Films

For food processors interested in using motion picture promotion, booklet details pertinent information on the making of business films. 18 p.—*Telefilm Studios, Inc., Hollywood, Calif. (204G)*

Eye Testing

Bulletin emphasizes importance of testing methods used to screen employees for defects in vision. Photos show operation of machine and standards applied to such tests. 4p.—*Keystone View Co., Meadville, Pa. (204H)*

PRODUCTS

Soluble Coffee Plant

Describes modern concept of soluble coffee manufacturing and includes many photographs and drawings. Necessary extractors and evaporators are detailed. Bulletin 15, 12 p.—*Rodney Hunt Machine Co., Orange, Mass. (204I)*

Meat Research

Annual Report comprises information on research activities in composition and processing of meats. Sections also devote attention to food poisoning, use of animal products in feeds, hide and pork skin studies. Bulletin 22, 58 p.—*American Meat Institute Foundation, Chicago. (204J)*

Brazil Nut Candies

Booklet specifies a wide line of commercial formulas for candies incorporating Brazil Nuts. 74p.—*Brazil Nut Association, New York City. (204K)*

Processing Peas

Booklet comprises study of extent to which various processing treatments affect recoverable yield of peas. Operations covered include harvesting, processing, grading, cleaning, washing, and inspection. Research Bulletin 186, 32 p.—*University of Wisconsin, Madison, Wis. (204L)*

Candy Formulas

Booklet comprises 18 commercial-sized formulas for various candy products. 17 p.—*American Molasses Co., Nulomoline Div., New York City. (204M)*

Preserved Cranberries

Tells of new method for preserving whole cranberries with syrup. Process available for commercial use. 8 p.—*Wisconsin Alumni Research Foundation, Madison. (204N)*

TRANSPORTATION

Truck Refrigeration

Pictures component parts and diagrams action of a mechanical truck refrigeration system featuring automatic temperature control. Bulletin 302, 4p.—Union Asbestos & Rubber Co., Chicago. (204O)

Dry Ice Coolant

Considers advantages of a dry ice cooling system in providing truck refrigeration. Diagrams and pictures show operation and installation. 6 p.—*Clifford Mfg. Co., Waltham, Mass. (204P)*

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Volumetric Telescoping Filler

This high speed production machine is factory customized to handle round or rectangular cartons or cans at speeds in excess of 100 units per minute. The operation is practically dustless when packaging such hard-to-handle products as pancake flour, insecticides, synthetic detergents, soap powders, caustic soda and cleansers because of Packomatic's exclusive method of flowing the product into the container. It's automatic, of course—accurate, fast and especially economical to own.

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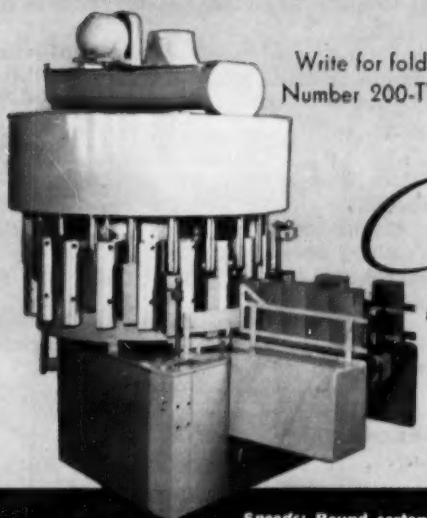

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PERSONNEL

Work Gloves

Four data sheets illustrate and specify line of canvas, leather palm, asbestos, and plastic work gloves. Products come in various sizes.—*David Gloves, Inc., Springfield, Ohio. (205A)*

Protective Equipment

Concerns line of gloves, aprons, and arm sleeves for personnel protection. Catalog 54-A, 28 p.—*Charleston Rubber Co., Charleston, S. C. (205B)*

Uniform Storage Cabinets

Treats of 10- or 16-compartment units for work clothes storage. Locker is said to speed clothes-changing time and facilitate laundry pickup. 16 p.—*Change-O-Matic Corp., New York City. (205C)*

Uniforms

Details on wide range of uniform styles and fabrics.—*Angelica Uniforms, 177 N. Michigan Ave., Chicago. (205D)*

PACKAGING

Colored-Tape Bag Closures

Folder presents facts on material and machine needed to enable closing of produce bags with colored tape. Speed, economy, and other advantages cited. 4p.—*Permacel Tape Corp., New Brunswick, N. J. (205E)*

Variety Packager

Bulletin pictures, describes, and enumerates advantages for a line of packaging machines designed to handle liquid, semi-liquid, granular, and powdered products. Shows shapes and sizes handled, and discusses the many kinds of packaging materials that can be used on the units. Bulletin P-801, 8 p.—*Stokes-Sims Co., Philadelphia. (205F)*

Produce Weigh-Bagger

Tells of a compact, portable, continuous weighing machine for prepackaged merchandise. Unit will scale from 1 to 10 lb. Form 3306, 1p.—*Exact Weight Scale Company, Columbus, Ohio. (205G)*

Weigher, Bag Loader

Considers operation of a conveyor-installed scale and bag-loading device, available in automatic or manual models. Price list given. 2p.—*Trescott Co., Inc., Fairport, New York. (205H)*

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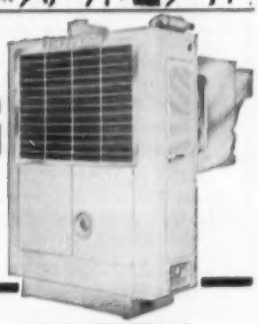

U. S. THERMO CONTROL CO.
44 So. 12th St.
Minneapolis 3, Minn.

For more data, circle this page number on card at back →

Arbitrating Grievances

—Continued from page 70

if he rules he does, he may go ahead with the grievance.

There are times, however, when an arbitrator will reserve decision on arbitrability, because not enough facts are immediately available, and then proceed with the grievance and at the end of the case determine whether or not it is arbitrable.

Who Presents Case First?

Q—Under the usual contract, management has the right to direct the work forces, maintain discipline, and so on, while the union has the right to file grievances which may terminate in arbitrations if the union believes the contract violated.

Doesn't this mean that the union must be prepared to present its case first before the arbitrator? In some of the cases, especially where discharges are involved, management has been forced to justify its case first. Why?

A (by Mr. B.)—The 'burden of proof' has very little meaning in arbitration. No rules of evidence are required for an arbitration. Therefore, it makes no difference who states the case.

It is, however, an arbitrator's duty, under the statute and under his oath, to inquire and satisfy himself that there is available all the information needed for him to decide the issue.

This is beyond the court—where such search is not required, where the jury takes the case as it is presented by the parties, and where it is rare that a juror asks a question.

Comment by Mr. J.—Basically, management has the right to initiate action—unless the contract expressly says otherwise. And the union's essential function is limited to a protest of that action. Accordingly, it behooves management to answer the question "Why?"—though not as 'burden of proof.'

Usually, it would seem up to the management to justify its supervisor's action that resulted in the grievance that reached the arbitration stage.

Of course, each party has the right to start the action for arbitration and should be prepared to show why the action was initiated, and also to justify the action taken.

But there is no requirement that either move first.

Stating the Problem

Q—It would seem that in any arbitration the first thing is to get a statement of the problem to which everybody agrees. If that's true, is it the responsibility of the arbitrator to see that such a statement is forthcoming?

A (by Mr. B.)—In the system advocated by our Association, we don't believe it necessary to have such a statement. Further, it isn't required under arbitration.

I'm amazed when, at the arbitration stage, the parties want to spend time trying to figure out what they are to arbitrate. They should previously have spent sufficient time on it in the grievance-procedure steps.

Possibly at the first step, when the grievance was filed, there was nothing in writing. But in the second step, as usually determined in most contracts, the supervisor reports to the personnel department or to the Labor Relations Office. And this report should have set forth the nature of the conflict. So I can't grasp any reason for using time to try to get an agreed statement.

In our system, either party may initiate arbitration under the contract. The initiating party sends to the other a request (we call it a 'demand') for arbitration. Here is set forth the claim and remedy sought.

Or it may be that the company asks for certain action—and may I add here that management unfortunately doesn't initiate arbitration enough, though they may have as much reason for doing so as unions have.

So the result of a demand is similar to the complaint initially filed in any court. Then the other party has a right to file an answer so that its position is set forth briefly at the beginning of the case, resulting in what lawyers call 'pleadings.'

Thus, a complaint and an answer are established—which ought to limit the arbitrator adequately. However, that is the matter he has to consider.

Comment by Mr. J.—It is very necessary for the arbitrator to know the issue in order to understand his authority. The fact should never be overlooked that an arbitrator functions on delegated authority.

An arbitrator has no power except that which the parties—both parties under the contract—delegate to him. So unless he knows the scope of the issue he may not know the scope of his authority.

Therefore, it is important that he know—in some way—just what the issue is in order that he can determine what his authority is for deciding the case.

Q—For his own benefit, then, he should somehow draw forth a statement of the issue—if it isn't made clear in the beginning?

A (by Mr. J.)—Yes, not only for his own benefit but mainly to fulfill his responsibility.

Printed Copies Available?

Q—Are decisions made under AAA rules recorded and made available? If so, in what form and where?

A (by Mr. B.)—Up to this time the Association has held the view that the arbitration award and opinion are properties of the parties. Therefore it does not publish the awards. However, from time to time some parties prefer to have the awards published, in which event they send the award to one of the publishing companies.

My own particular stand against publication is the opinion concurred in by numerous others who have participated in arbitration for many years:

If we were to allow published awards to accumulate and then try cases on them as precedents, we would not be doing what arbitration is supposed to do—namely, solve each difficulty on the basis of the material and information provided by the parties interested.

Comment by Mr. J.—I agree with that in a general way, because sometimes we find secondary motivating forces becoming bases for particular awards.

It's a mistake to think that an arbitrator puts all influencing factors into his *written* opinion. An arbitrator may decide a specific case because he's convinced of the accuracy of one witness and equally certain the other is in error.

But he won't necessarily put that down in writing. So you can never know for sure when you read a *written* opinion that you are getting a true picture of the case as the arbitrator really saw it.

While a case may be decided on its merits, the influencing forces in a particular plant—between a specific company and union—usually do not apply in other plants. So as a rule, arbitrators contend that one arbitrator is never bound by any other arbitrator.

There are no rules or precedents in arbitration as there have been in the building of our common law. From my own experience in relatively few cases does either company or the union rely on, or attempt to influence the arbitration results by citing some other arbitrator's award in a different case. *End* (Resume reading on page 71)

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Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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Engineer Draftsman capable of designing can handling equipment and making can handling system layouts. Salary commensurate with abilities. Reply with hand printed letter and representative sample of drawing ability. All replies confidential. P-7902, Food Engineering.

Wanted—Maintenance Superintendent. Excellent opportunity in expanding New York State plant freezing vegetables. Give age, experience and approximate salary expected. P-8291, Food Engineering.

Plant Superintendent established canner located in Ohio has opening for experienced superintendent with energy and ability to supervise effectively. Salary is open for discussion. Replies will be held in strict confidence, and should include educational background, experience, age, and present salary. P-8713, Food Engineering.

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Company has excellent insurance and profit sharing bonus program.

Send complete resume and experience record with first letter.

Interviews will be arranged for at our expense.

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Food Market—Located thriving city NY State. Well established. Receipts $1,250.00 weekly, can increase. Showing substantial profit. Beer permit. Rent $45.00 monthly. Attractive lease. Equipment finest possible. Sound investment opportunity. Attractively priced. Rendlog Sales Co., 1775 B'way, NYC. PL-7-5345.

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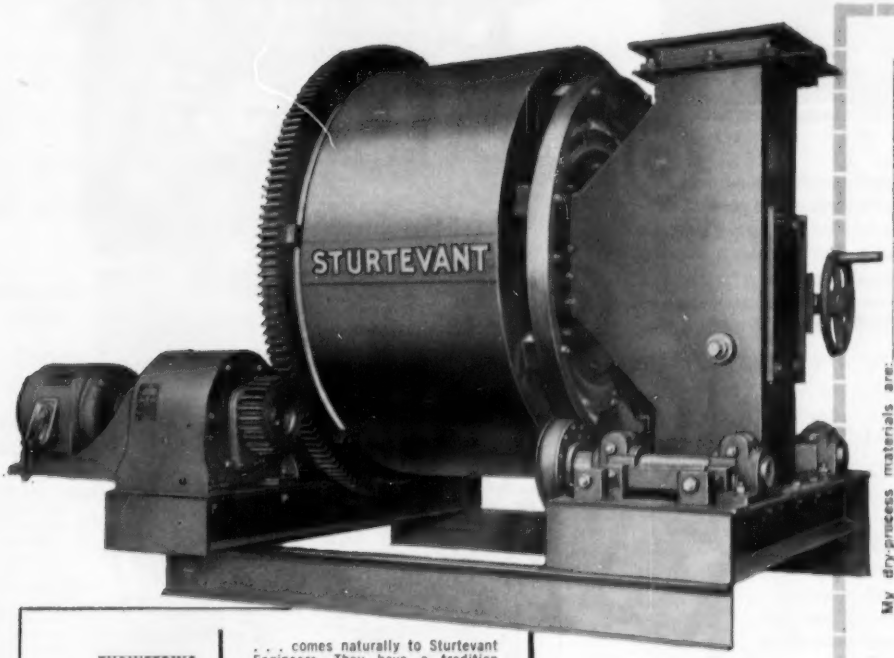

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BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

My dry-process materials are:_____

Desired capacity is:_____

Name_____ Title_____

Firm_____

Street_____

City_____ Zone_____ State_____

STURTEVANT MILL COMPANY, 106 Clayton Street, Boston 22, Mass.

Please send me your bulletin on Dry Blenders ☐

Also bulletins on machines for:

☐ CRUSHING ☐ GRINDING ☐ PULVERIZING
☐ MICRON-GRINDING ☐ SEPARATING ☐ BLENDING
☐ SUPERFINE SELECTING ☐ GRANULATING ☐ CONVEYING

For more data, circle this page number on card at back →

STOKESWRAP

packaging assures impulsive sales appeal at low cost *Automatically*

FACT #1

Modern retail merchandising demands packaging that sells at the point of purchase... that helps *display* the product ...*protects* it from damage... secures *attention* on the shelf.

FACT #2

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FACT #3

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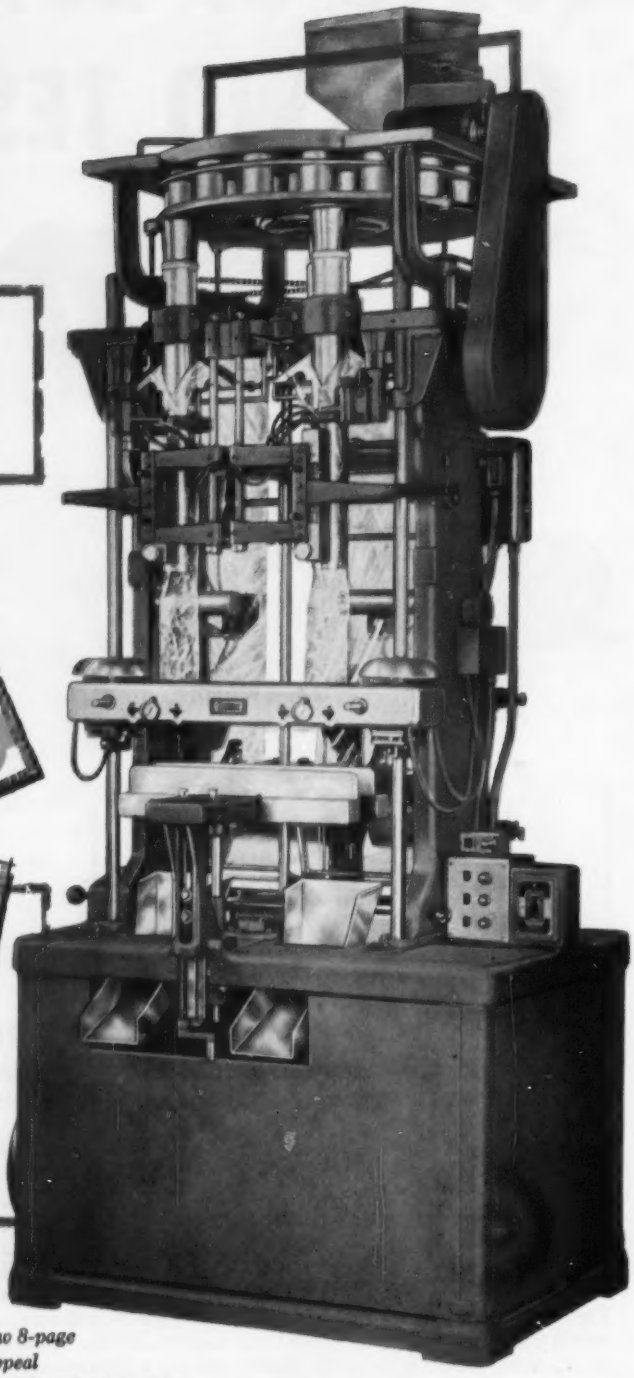

If your products are fighting for attention on the retailer's shelf, investigate Stokeswrap. Write today for your copy of the new 8-page catalog P-801 and discover how Stokeswrap eye appeal can help create more impulse sales for you!

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fmc

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1. get more information on products advertised or described in New Equipment, New Packages, or Just Off the Press
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3. order reprints offered in this issue
4. notify us of a change of address

Product Index on other side

1. FOR PRODUCT INFORMATION

Circle page numbers at right. Suppliers will reply direct to you. No obligation. →

IMPORTANT — FOR PAGES SHOWING MORE THAN ONE ADVERTISED ITEM, USE THE GUIDE BELOW.

2 All items shown
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140 All items shown
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For pages showing more than one advertised item, use guide at left.

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Product or Service.....

No. Employees In Your Plant.....

1	2	3	4	5	6	7
☐	☐	☐	☐	☐	☐	☐

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No. & Street.....

City..... State.....

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PLEASE TYPE OR PRINT—GIVE COMPLETE INFORMATION

Name .....

Position .....Product .....

Company .....

Street .....

City .....State .....

January, 1956 Card expires April, 1956

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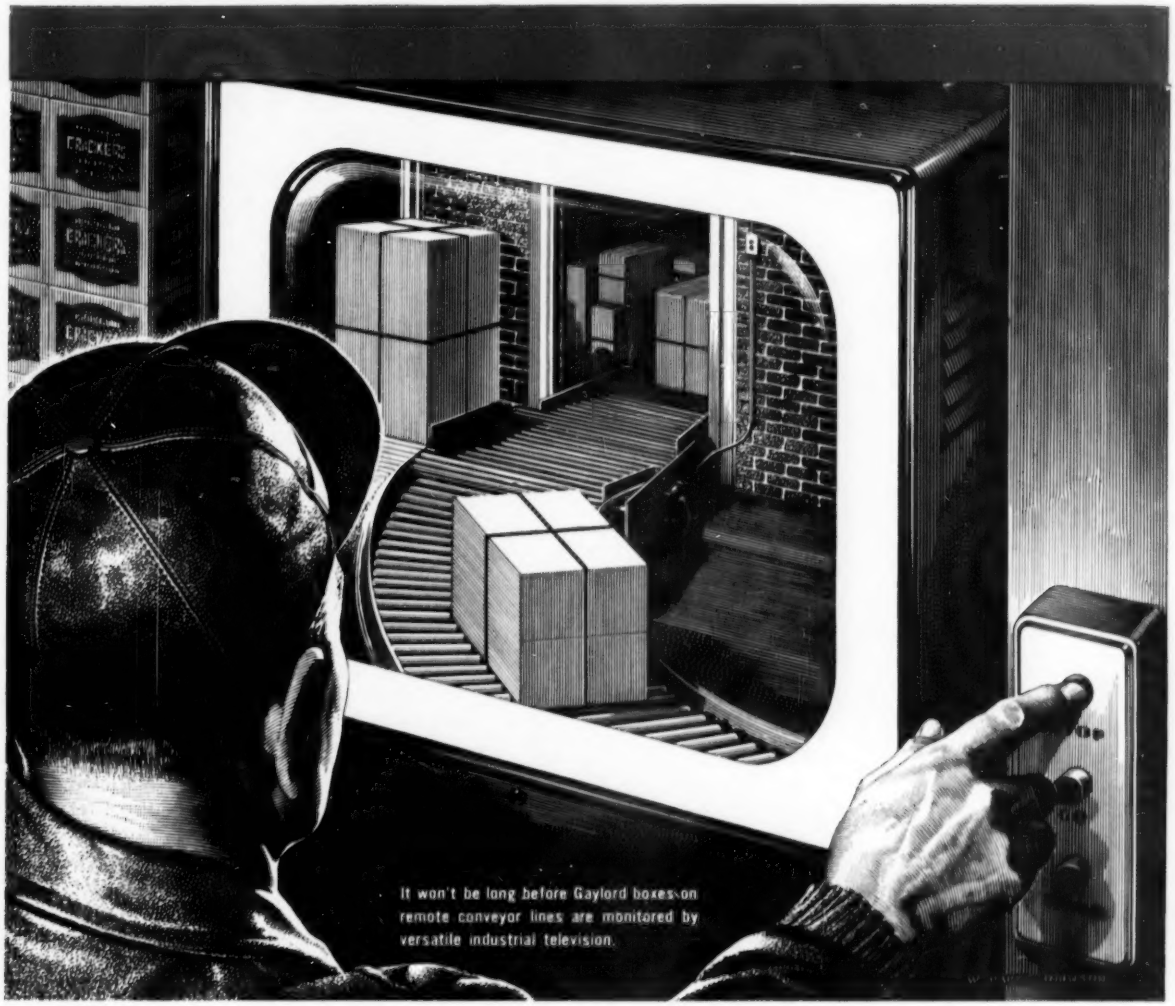

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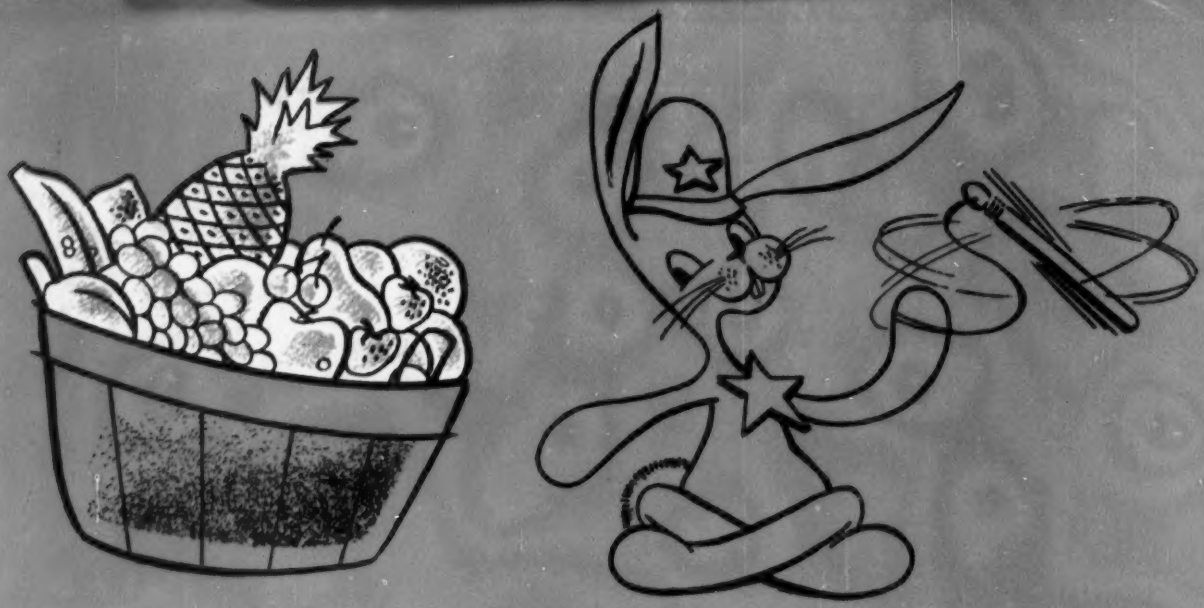

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